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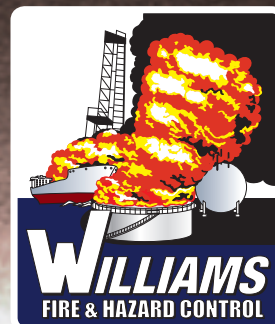
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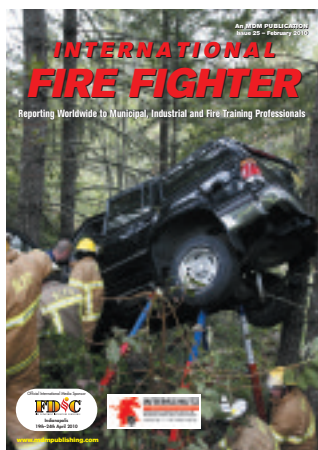


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Publishers
David Staddon & Mark Seton

Sales and Editorial Manager
Mark Bathard

Contributing Editors
Peter Cook, Tim O'Connell, Bernard
Valois, Captain Jason Graber, Deputy
Chief Timothy Lasher, W.D. "Dave"
Cochran, John Walters, Mark Bathard,
Nick Grant, John Lowe, Dr Clifford
Jones

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The Abbey Manor Business Centre,
The Abbey, Preston Road,
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Tel: +44 (0) 1935 426 428
Fax: +44 (0) 1935 426 926
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The nightclub fire in Perm, Russia



By J.C. Jones

School of Engineering,
University of Aberdeen
j.c.jones@eng.abdn.ac.uk

This piece is being written about three days after the nightclub fire in Perm, and the death toll stands at 112. The author will comment on nightclub fires generally and on the circumstances of the fire at Perm. In what he hopes will be seen as an original contribution to discussion of the fire he will attempt a simple calculation.

Many lives have been lost in fires at places of recreation and entertainment. A previous contribution to this series of periodicals¹ dealt with fires at Karaoke clubs. The worst nightclub fire in US history was the Beverly Hills Supper Club fire in Kentucky in 1977, in which 165 persons were killed. In one room a comedy act was taking place. When it was interrupted to warn patrons to evacuate because of fire that was seen by some as part of the act and dismissed! There was observance in 2007 of the 65th anniversary of the fire at Cocoanut Grove, a nightclub in Boston MA where, in November 1942, there was a fire which caused 492 deaths. The cause of the fire was ignition of thin paper adornments within the club building.

At Perm there are accounts of the use of plastic insulation and decorative twigs on the ceilings without regard for their effects on fire safety, and of the use of fireworks. There have been arrests following the fire. The author has no information beyond what such news features as reference² record. When in a fire there is inability to exit, death can result from one of two factors: smoke inhalation and flashover. Flashover is of course the sudden transition from a small, localised fire to one involving the entire enclosure in which the fire began. It involves a huge increase in the heat release rate, and in fire engineering times to flashover can be correlated with evacuation times. If the latter are much shorter than the former persons will be safely outside the building before flashover.

When persons are evacuating a building their speed of movement is lower than the unrestricted speed which applies in the absence of other persons in close proximity. Calling the restricted speed S (m s^{-1}) and the unrestricted speed S_o (same units), the equation³

$$S = S_o - 0.28d$$

can be applied, where d is the number of persons per unit floor area. A typical value for S_o is 1.25 m s^{-1} . Information on the fire at Perm being at this stage so limited, application of the equation to the fire there can only be illustrative. Such application is however not without value and will be attempted. We imagine that the 112 persons who died

were unable to exit an enclosure within the nightclub of which they were the only occupants. The area of this hypothetical enclosure is estimated in the calculation in the shaded area below.

Inability to evacuate means that although persons are moving around they are doing so without progressing in any direction because of the effect of other persons similarly moving and there is no movement of the assembly of persons, only within the assembly. Applying the equation above, such circumstances mean:

$$S = 0$$



$$\delta = (1.25/0.28) \text{ persons per square metre of floor space}$$

$$= 4.5 \text{ persons per square metre of floor space}$$

The enclosure was therefore:

$$(112/4.5) \text{ m}^2 = 25 \text{ m}^2 \text{ in area}$$

Equivalent to the area of a square of 5 m side.

The calculated density of persons is very high, suggesting overcrowding. If it is at all valid having regard to the paucity of information on the fire which is the subject of the calculation, it must relate not to occupancy across the premises before the fire but to a location where persons had become trapped in their attempt to escape.

It is possible that information from the enquiry will enable the very simple calculation above to be evaluated. Equally, it is expected that calculations of this genre will feature in the enquiry.

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Kim Henry has been promoted to Vice President, Sales and Marketing for North America Performance Fabrics. In this role, Kim will support our partners and customers in the North American fire service, military, and industrial markets. Kim will report to Bill Lawson, Managing Director and COO.



Helmut Zepf has been promoted to Vice President, Sales and Marketing for Europe and Middle East. In this role, Helmut will support our partners and customers in Europe and the Middle East for the fire service, military, and industrial markets. Helmut will report to Bill Lawson, Managing Director and COO.

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By J.C. Jones

School of Engineering,
University of Aberdeen
j.c.jones@eng.abdn.ac.uk

The recent fire in McKinleyville

McKinleyville California was, on the 17th of last month, the scene of a fire believed to have begun in the following way¹

Disposable rags having been used in wood staining and contaminated with oil were placed in a cardboard box and, after a period, underwent spontaneous combustion. The following comments will be made.

Spontaneous combustion of oily rags and cloths is a well documented phenomenon² and is not difficult to understand. Susceptibility of a substance to spontaneous combustion depends on how readily the substance releases flammable gases and vapours ('volatiles') by thermal decomposition on heating. This was known in shipping practice long before such matters were the subject of scientific investigation. If a shipment of coal was starting to become heated by spontaneous combustion a background odour of volatiles would alert the crew who could then take whatever measures were possible in those far-off days to prevent ignition and endangerment of the vessel and its occupants. It is very widely known that a high-volatile coal such as a lignite (a.k.a. brown coal), or

established having been aided in its development by the oil contaminant.

The oil which the rags contained was almost certainly of plant origin. Linseed oil for example has been known to lead to the sort of behaviour observed at McKinleyville. This contains compounds including linoleic acid and linolenic acid, examples of 'fatty acids'. The term 'fatty acids' arises from the use of animal fat as illuminating oil before petroleum products became available and the presence of such acids in the animal fat. Nowadays plant oils are of greater importance than ever before because of the expanding use of biodiesels. The oils from which these are made also contain fatty acids including stearic acid, oleic acid and palmitic acid. We might expect that contamination of cloths and the like with these could lead to a fire of the type observed at McKinleyville, and there is a further factor to be considered. Plant oils are frequently esterified with methanol in order to raise the cetane index.

In an oily rag the contaminants are not of course chemically bound to the substance from which the rag is made. This means that when they start to evaporate, which they inevitably will, it is as if volatiles were being released at room temperature. The oil therefore acts as a simulated volatile.

braunkohle) is a greater spontaneous heating risk than a low-volatile one such as an anthracite. Not only the presence of volatiles but the temperature pattern of their release is important. One reason why wood readily displays spontaneous combustion is that it starts to release volatiles at temperatures as low as about 80°C. The lower the temperature of initial volatile release the greater the spontaneous heating hazard.

In an oily rag the contaminants are not of course chemically bound to the substance from which the rag is made. This means that when they start to evaporate, which they inevitably will, it is as if volatiles were being released at room temperature. The oil therefore acts as a simulated volatile. Once its action has begun to heat the assembly of rags a temperature will be reached where they too start to release volatiles, though by thermal decomposition as noted above, not simple evaporation. Spontaneous combustion is by then

Raising of the cetane index means elimination of ignition delay in the engine, requiring enhanced reactivity. If such enhancement also applies at room temperature we should expect that biodiesel so processed would be more dangerous as a contaminant of rags and cloths than the unprocessed plant oil.

In the press account in¹, one sentence reads: *Disposable rags were determined to be what sparked the fire . . .*

There was of course no spark involved and 'sparked' should read 'caused'. Alas, imprecision of this sort is common enough in press accounts of fires. IFF

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CHEMGUARD, the global leader in foam concentrate and foam systems R&D and manufacturing, and Williams Fire & Hazard Control, the world expert in flammable liquid fire suppression, have formed an alliance to develop high-performance fire-fighting foam concentrates.

Chemguard and Williams introduced the first products resulting from their collaboration in late 2009: ThunderStorm F-601B, a 1x3 alcohol-resistant aqueous film-forming foam (AR-AFFF), and F-603B, a 3x3 AR-AFFF. Both foam concentrates are suitable for hydrocarbon and polar solvent fires.

"Chemguard sees great promise in this partnership with Williams, the leader in storage tank and flammable liquid fire fighting," said Roger Bower, Chemguard president. "We intend to aggressively develop the 'next evolution' of advanced foam concentrates, starting with ThunderStorm F-601B and F-603B."

Dwight Williams, Williams Fire & Hazard

Control CFO and chairman, added, "We expect our work with Chemguard, the only fully integrated global fire-fighting foam concentrate manufacturer, to result in significant product development and noteworthy fire-fighting performance enhancements."

ThunderStorm F-601B and F-603B AR-AFFF foam concentrates, the first in a line of "next evolution" foam concentrates, exceed the highest performance standards in the industry. Formulated from special fluorochemical and hydrocarbon surfactants, high-molecular-weight polymers, and solvents, ThunderStorm F-601B and F-603B have a much lower viscosity than other 1x3 and 3x3 polar-solvent AFFF products, which enhances performance in foam proportioners, in-line eductors, balanced-pressure systems, and other equipment.

Fully compatible with current ThunderStorm reserves, F-601B and F-603B offer improved extinguishment and enhanced firefighter safety

for both conventional Class B hydrocarbon fuel and polar solvent Class B fuel. Because of their excellent wetting characteristics, ThunderStorm F-601B and F-603B also are effective on Class A fires.

For additional information, contact:
John Vieweger, Vice President Sales & Marketing
Chemguard Fire Suppression Division
1-817-473-9964 x206
Dwight Williams, CFO and Chairman
Williams Fire & Hazard Control
1-800-231-4613

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Nomex® fire fighter clothing in long time test under real conditions

DUPONT, in conjunction with its Nomex® Quality Programme (NQP) partners, has initiated a new long time test programme for fire protection clothing made of Nomex®. The aim is to evaluate the performance of the latest generation of DuPont™ Nomex® outer gear by the crew of RAGTAL (Regionale-Atenschutz-Geräte-Träger-Ausbildungsanlage), ex fire fighters who now train fire fighters by recreating a multitude of real life conditions in a contained facility.

RAGTAL, located at Wasserbillig, Luxembourg, trains fire fighters from across Europe in a wooden-heated fire facility and flash over unit. The training programmes consist of experiencing the correct tactics to be adopted to attack a fire inside a building, fire fighting in complicated conditions such as low visibility, emergency rescue from extreme situations as well as the use of video cameras to detect people and fires. With approximately 1,000 trainees per year, the physical stress for every instructor of the Combat Fire Behaviour (CFB) team is quite demanding and therefore reliable performing protective apparel worn during the training programmes is important to the trainers. That's why the RAGTAL fire trainers wear state of the art protective apparel with an outer layer of Nomex® Tough that not only offers outstanding flame and heat resistance but is extremely durable because Nomex® is inherent in the fabric and therefore protection is retained for the life of the garments.

Design modifications to meet demands of fire trainers

The Nomex® protective clothing worn by the RAGTAL Combat Fire Behaviour instructors is the result of a two-year joint project, run by DuPont in conjunction with six partners of the NQP: fabric manufacturer Fritsche and the garment manufacturers Consultiv, Isotemp-Vorndamme, S-Gard, Texport and Viking. The manufacturer's standard dark red designs are used in the clothing that features an outer shell of Nomex® Tough. However, slight modifications were made



Crew from RAGTAL in Luxembourg wearing fire protection clothing made of Nomex®

to the designs to meet the special requirements of the RAGTAL training crew.

Life test programme under real conditions

The Nomex® fire fighting apparel, which was given to RAGTAL in June 2009, initiated a new evaluation programme within DuPont™ NQP. The CFB trainers act as experts who test the wear and comfort

The protective clothing for the RAGTAL Combat Fire Behaviour instructors are premium products and their efficiency is tested daily

of the apparel and put the performance of the suits to the acid test under the given extreme conditions. After every session, the trainers control and record the quality of the protective clothing. Their experiences of protection and comfort, fabric construction, membrane

performance and the performance of other materials used are passed on to the respective manufacturer and DuPont. This feedback serves as a basis for the improvement of fire protective apparel made from Nomex®.

"The protective clothing for the RAGTAL Combat Fire Behaviour instructors are premium products and their efficiency is tested daily," says Juergen Klotz, Territory Manager for Germany, "the knowledge we gain forms the basis for future developments of Nomex® products to achieve our goal to increase the comfort of high performance garments for the next generation of fire fighting suits."

For additional information please contact:
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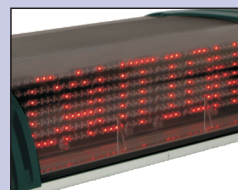
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LED technology has replaced traditional halogen and strobe beacons offering superior output with reduced maintenance



Emergency Warning

By Peter Cook

Fire fighters are well aware that warning lights are a vital necessity to help safeguard the vehicle, its crew and members of the public, by helping to clear the traffic whilst en route to an incident as well as alerting oncoming traffic of the existence of stationary vehicles and any crew once at the scene.

Over the years, the effectiveness of the original types of warning lights has been reduced for a number of reasons. There are today many more users of warning lights along with the increased use of road lights and illuminated advertising/information signs. These additional lights have all made traditional Emergency Vehicle Lighting less noticeable.

In addition there is an ever increasing amount of distracting equipment inside modern passenger vehicles – such as navigation systems, mobile telephones, audio equipment etc all of which can be potential distractions for motorists, diminishing the amount of attention given to other traffic.

To try to maintain the effect of warning lights over the years, vehicle lighting has steadily evolved from a single on/off flashing light to rotating beacons and onwards to today's highly visible Lightbars.

The first Lightbars introduced over thirty years ago had rotating tungsten sealed beams coupled with mirrors to multiply the lighting effect. Sealed beams were gradually replaced by halogen rotators giving an increased light intensity output

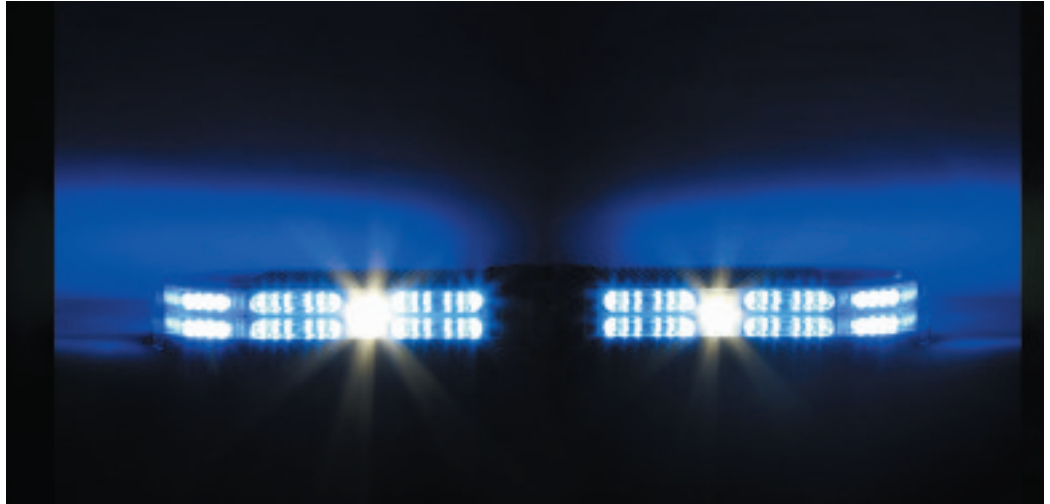
and still today this approach is still a popular and frequent choice for certain warning needs where budgets are tightly constrained.

Then in the 90's came the introduction of strobe lights offering a higher technology solution for warning purposes. Strobe technology significantly reduced the battery drain associated with halogen lights and provided the opportunity to programme a variety of flash patterns – intended to make warning lights even more effective and attention getting. However, strobe lights still have some limitations. Strobe lights have a very short "ON TIME" or burst of light, they therefore tend to lose their effectiveness during daylight hours. Also the burst of energy is in a colour range that washes out colour and all colours can appear to be similar to daylight.

Strobe light is an intense white light, relying on a coloured lens to produce the desired colour (e.g. blue or red).

Tungsten and strobe technologies can be effective but are power hungry, placing additional load on the engine. They also have relatively short lives, requiring regular light source replacement.

*Latest LED lightbars
Provide high output
with long life and low
power consumption*



Over recent years LED technology has displaced Halogen and strobe technology in many applications. LED technology is potentially much more efficient than these older technologies offering considerably more light output with vastly lower power consumption.

This reduces the load on the vehicle power source, which has environmental and economic benefits, saving fuel whilst also extending the life of engine components such as alternators. Unlike strobe and halogen products, it is now possible for the warning lights to be lit without having the engine running.

LEDs also provide a virtually instant on-time and can have a flash of any required length (a major benefit compared to strobe).

It is also important to note that LED technology generates light of the required colour without the need for a coloured lens, allowing clear lenses to be used which maximises the light output. It also removes the need to have multicoloured lenses to achieve different colour outputs making effective environmental sealing easier to achieve.

LED technology started with what the industry refers to as Generation 1 LEDs. These devices have only distribution optics and are very directional with limited intensity. These LEDs were superseded by much improved and rugged Generation 2 LED's

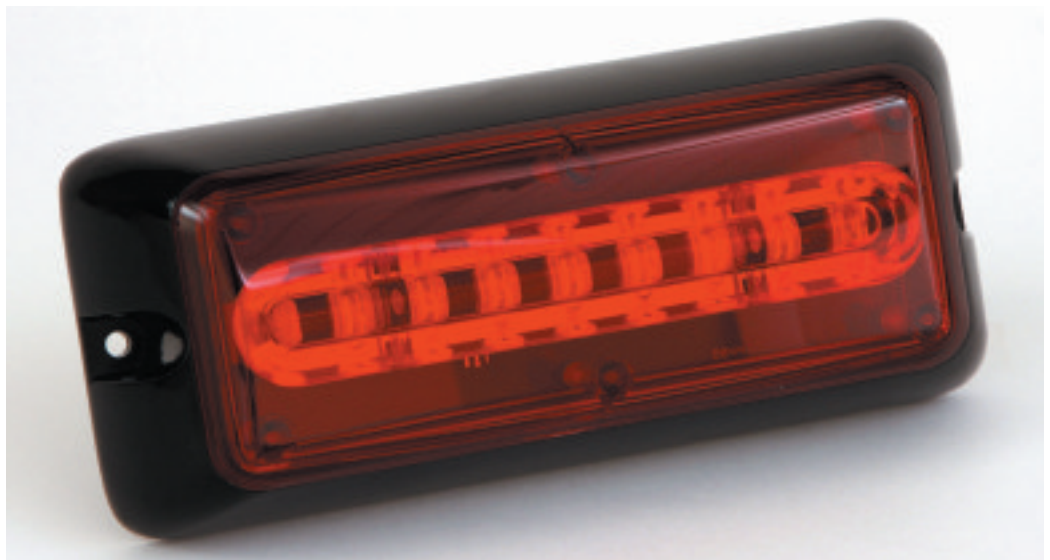
which had higher outputs and also contained both distribution and collection optics and so were able to provide a larger viewing angle.

In recent years, generation 3 LEDs have become widely available. Generation 3 devices can produce a much higher light output than Generation 2 and are more versatile, when coupled with appropriate optics they are capable of larger viewing angles.

Generation 3 devices are currently the ultimate in performance for LED warning lights. They are considerably more efficient than Generation 2 devices – producing more light for the same current consumption. Additionally generation 3 devices can be driven at much higher drive currents than generation 2 devices can, the effect of both these factors combined means that a correctly designed generation 3 product will have considerably more light output than a generation 2 device.

As well as increased light output, newer generation products offer the potential of a substantial increase in working life as well. With Generation 1 devices a maximum useful working life of around 25,000 hours was typical, with Generation 3 devices a 50,000 hour life is easily achievable and lives of in excess of 100,000 hours are commonplace.

This extremely long life generates substantial operating cost savings when compared with



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halogen and strobe products which, although reliable, have a much shorter life than LED.

It must be remembered that the cost to change a halogen bulb or strobe unit in a safe manner given the working heights involved on a typical fire vehicle will be substantially more than the cost of the light source itself, this can also cause unnecessary vehicle downtime due to the need for safe working conditions.

There is however a need for caution when discussing the working life of LED products. To achieve sufficient light output and a long life, LEDs – especially high power generation 3 types, have to be used under controlled conditions. Good thermal management and careful control of LED drive currents is critical. Quality manufacturers use extensive heatsinking to dissipate heat from LED semiconductor junctions. This heatsinking does add to the cost of a well designed product but is absolutely vital to ensure a long trouble free life. Poor quality thermal management does save on initial cost but results in a much reduced light output as well as considerable reduction in life. Where there is poor thermal management, the typical failure mode will be that the LED light output reduces to a low level over a relatively short period, this reduction in output will often be permanent, but because it occurs gradually, it can go unnoticed.

To achieve sufficient light output and a long life, LEDs – especially high power generation 3 types, have to be used under controlled conditions. Good thermal management and careful control of LED drive currents is critical.

Good quality latest generation LED lights are far more effective during both day and night than either halogen or strobe, however poor quality LED lights which give very little light output could be a more of a danger than an asset to the emergency vehicle. When they are used, a driver believes his lights are giving some protection by alerting other road users when in fact they can hardly be seen.

Rather than worry about which generation of LED has been used, or get involved in detailed technical discussions about the quality of heatsinking used, potential purchasers should ask about the length of product warranty offered, this will provide a good guide to the quality of the product.

Reputable manufacturers typically offer a 5 year warranty on latest generation products, beware of suppliers offering a lesser warranty as this may be indicative of lower quality LEDs or poor thermal management.

LED lighting is easy to control both electronically and optically, meaning good light distribution



White light LEDs are becoming increasingly popular for auxillary, work and scene lighting, offering high efficiency and a long maintenance free life

can be achieved without the need for bulky mirror and reflector assemblies. This allows light to be accurately directed to where it is needed, whilst at the same time allowing the height of lightbars to be reduced making vehicles more aerodynamic. However, you must always remember that the optical performance of the product is paramount. The fundamental requirement of a warning light system is that it provides a suitable light out-

put to attract attention without producing excessive glare that could create a hazard to other motorists.

It is vital therefore that any reduction in the product height does not compromise the visibility of the warning lighting, light output at all relevant angles must be verified to ensure it is adequate without being excessive. This is especially important for products mounted on high vehicles such

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Latest LED directional warning lights can offer a 180 degree viewing angle



as fire engines where the vehicle itself can obscure the warning lighting when viewed from normal viewing height.

Products that have been independently tested to stringent European standards by an accredited testing body are awarded approval to regulation EC65. This testing verifies that maximum and minimum light intensity levels are met at all relevant angles, and that flash frequencies are within an acceptable range. It also involves testing of assemblies to ensure that their construction provides a high level of ingress protection. EC65 approval also confirms that the colour of light emitted is within the allowed part of the colour spectrum (the correct shade of blue for example). Checking the precise colour may seem pedantic but poor quality lightbars may for example emit a supposedly blue light that is in fact virtually white and

therefore very ineffective.

In many countries EC65 compliance is mandatory, in other countries where it is not mandatory, specifiers should still use EC65 approved products, this is an easy way to demonstrate the use of best practice and ensure good quality dependable products are supplied.

A warning light system that has been independently approved to EC65 can be relied on to be effective, fit for purpose and with sufficient ingress protection to provide trouble free service under real life operating conditions. It is important to understand the difference between products that have been independently tested and approved to this standard as opposed to manufacturers own in house testing and resulting claims of compliance. Test house certification should always be available to support claims of product approval, and

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reputable manufacturers will be more than happy to provide copies of documentation.

In addition to the lightbar, Flashing headlights are still a very good means of warning although they give little side warning and are of course white rather than the desired warning colour. However, further developments in LED's and in the culmination optics now mean that directional LED's can produce a vivid front warning coupled with a 180 degree wide angle warning to give excellent side protection. These are particularly good when used in front grille applications on Fire Trucks which tend to have high mounted Lightbars. The high Lightbar is great at warning at a distance but has less value in urban congested areas. Wide angle type directional LEDs lights are also very good for the sides and rear of the Fire Tender as again they can give up to a full 180 degree warning angle.

Colours of warning lights for the various Emergency Services vary throughout the world with some Fire Services using Red others Blue, or perhaps a Blue/Red combination or even in some cases Amber. Some also add in either white or green lights.

Fire Services in some countries in Europe use amber which would seem totally impractical with the large amount of amber warning lights used on a variety of vehicles from Road Sweepers to Break-down-Recovery Vehicles to even vans and tipper trucks.

The coming years will no doubt see even more progression in the capabilities and usage of LED products in helping to provide a safe environment for Fire-Fighters.

In addition to warning lighting, LED technology is increasingly being used for work and scene lighting.

White LEDs are vastly more efficient than tungsten halogen alternatives offering more light whilst consuming less power. Latest white LEDs tend to have a very high colour temperature and provide excellent colour rendering. A good quality white LED device would typically produce around four to five times the light output per watt of power consumed than that of a traditional tungsten halogen light source.

In addition to warning lights themselves, control systems are also improving as a result of latest technology. Increasingly sophisticated control systems now allow a wide range of light sequences and modes to be activated by a single pushbutton, ensuring that during emergency response situations or upon arrival at a scene the correct warning lights are all lit without the complication or delay of having to operate multiple switches.

Latest systems such as the Haztec Eurosmart system have facilities to integrate siren control, headlamp flashers, siren tone selection, warning light control, PA functionality, and unlock functions into a single simple to operate system.

In summary there are many choices when it comes to specifying all forms vehicle warning and auxiliary lighting. Given that correct performance of this lighting literally can make the difference between life and death, selection of the right products is paramount. The value of working with experienced experts and insisting on high quality products cannot be overstressed.

Peter Cook is the Marketing manager for Haztec International Limited, a UK based manufacturer of vehicle warning and lighting products that are supplied and trusted worldwide.

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From Bricks to Beach Balls

The evolution of the Vehicle Rescue Strut

By Tim O'Connell

In talking with Rescuers around the world I often ask the question “what is your primary job at a motor vehicle accident with a trapped victim”? They most often respond (looking at me like I’m an idiot) “get the tools and cut the victim out”. They are, of course, wrong.

Yes, extrication is an important part of the job, along with several other important steps. What inexperienced Rescuers don’t understand, and what experienced Rescuers often forget in their haste to grab the big hydraulic tools are the two primary jobs that we need to accomplish:

- 1** Protect ourselves
- 2** Protect our patients

And whom do we most often need to protect the patient from? Us, the Rescuers!

Let’s go through a typical vehicle accident. For this article we will use the example of a vehicle on its side, after a collision, with victims trapped. Arriving Rescuers need to position their vehicles to protect the scene while searching for hazards such as power lines and leaking fuel or chemicals. These hazards need to be addressed and resolved prior to extrication. Next is typically the positioning of charged hose lines for immediate response to fire. Most Rescuers perform these steps correctly.

Now our Rescuer is looking at a very heavy lump of deformed metal and plastic with an injured victim somewhere inside. Here is where Rescuers typically start doing things wrong; they fail to adequately stabilize the vehicle.

To better understand why Rescuers often do such a poor job of stabilization and why stabilization is so important we need to learn a bit about the evolution of the motor vehicle. In the past most vehicles were manufactured with a heavy steel frame upon which were bolted or welded heavy steel cages and skins. We call these vehicles “bricks”. When they rolled over in a crash they would deform somewhat but tended to retain most of their shape. Unfortunately for the victims, most of the forces of the crash impact were transmitted through the vehicle to their bodies. When these vehicles ended up on their sides it was fairly easy to stabilize them with wedges and wood cribbing. Since the cribbing could push against the steel frame and thick steel skin, the vehicle would



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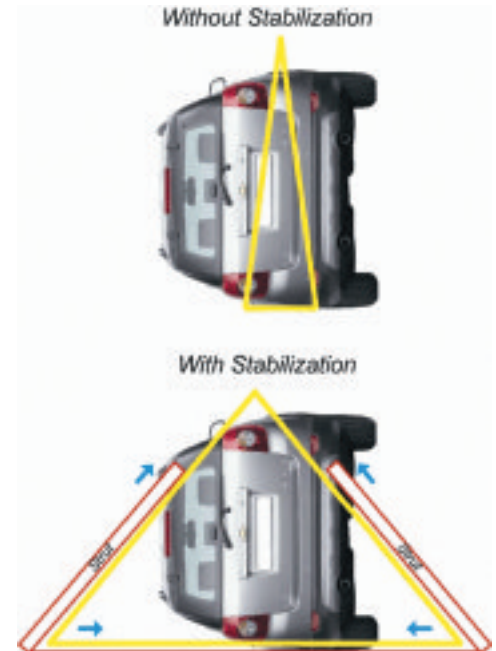
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The top pyramid has a narrow base, is not very stable and can be tipped over easily. Using two or more struts on opposite sides of the car causes these forces to cancel each other out, and squeeze the car like a vice. This creates a pyramid with a very wide footprint producing a very stable car

be fairly stable. When I started in the Rescue Service in the early 80's, any further stabilization was provided by the biggest Rescuers literally leaning on the car! Interestingly, the philosophy of the Rescuers was also different. Stabilization was not thought to be very important. It was perceived that our job was to move metal. The vehicle would be rocking with guys climbing all over it prying parts off with the primary rescue tool of the day, the Spreader. Considering how delicate a victim's spine is with a broken neck or back I'm sure we further injured many victims because they were unnecessarily moved and jolted around. Sometimes these inadequately stabilized cars shifted or fell, resulting in Rescuers becoming victims.

Today's vehicles are made of lightweight metal cages with thin springy sheet metal or plastic panels spot welded or glued to the cage. We call these vehicles "beach balls". When they roll they tend to bounce around like a ball because of the resilient, dent resistant panels and lightweight construction. We are seeing vehicles that have bounced into trees, on top of other vehicles, into buildings and other unusual positions. Stabilizing these vehicles can be extremely difficult and requires the ability to support loads off the ground. During crash impacts the panels and crush zones of the vehicle deform, absorbing energy and translating forces around the victims, thereby improving their chances of survival. The result is that we now arrive to find a crunched up ball of plastic and metal with a viable patient in the middle of it. The vehicle may also be precariously perched on top of another vehicle or other object. When we pound wedges or cribbing between the ground and vehicle we get very little effect because the dent resistant panels flex and absorb



Always be mindful of your equipment's load ratings and capabilities. This is a fully loaded gasoline (petrol) tanker

the wedges. Because of this, we have lost the ability to stabilize most of these vehicles effectively using wood or plastic cribbing alone.

Rescuers have also changed. Virtually all Rescuers are now medics. We understand that our primary job (after protecting ourselves) is patient care. The last thing we want to do is to cause further injury to the patient in the process of delivering them to advanced Life Support personnel. To do this, we must completely stabilize the vehicle, use care when using the modern day primary extrication tool (the Cutter), and delicately handle the patient's spine while removing and transporting them. The first and most crucial step is stabilization, and most Rescuers are bad at it.

Why do we do such a poor job of stabilization? There are several reasons. Some are:

- Leadership. Leaders may not recognize the importance of stabilization and fail to make sure the vehicle is correctly stabilized.
- Insufficient equipment. Standard wood or plastic cribbing alone is often inadequate on newer vehicles.
- Tunnel Vision. Rescuers are anxious to use the big hydraulic tools and forget or ignore good stabilization practices.
- Experienced personnel. Since the hydraulic tools are often taken by the most senior (experienced) Rescuers, the inglorious job of stabilization is often relegated to the junior, inexperienced Rescuers.

How do Rescuers deal with these "beach ball" vehicles? Rescue equipment designers (I am one) understand how new vehicle technology has evolved, and have responded with equipment to solve these issues. The

technical term for these tools is "Tensioned Buttress Systems". The simple term is "Struts".

Before we can understand Struts and what they can do for us, we need to learn a bit about the physics of stability. The easiest way to picture stability is to use a triangle. If you have a triangle with a narrow base sitting on the ground, it is easy to tip it over. Widen the base of the triangle and it becomes much more stable. Anyone who has ever used an aerial apparatus knows that extending the outriggers widens the base of their triangle making the apparatus more stable. Our crashed vehicle on its side is sitting on a narrow base, and the cribbing placed below it is fairly ineffectual. By positioning Struts against it and tightening them

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By stabilizing a vehicle with struts, Rescuers have the option of removing a large amount of the vehicle's frame without shifting the load



into place we dramatically widen the base of our triangle and improve stability. It is hard to understand how much Struts stabilize a vehicle until you have seen them in action. Within minutes you are able to convert your "beach ball" into a rock solid platform, creating a safe working environment for the Rescuers and protecting the victim's spine while extrication procedures are taking place.

So what is a Strut? Basically it is just a stick. In fact the first Struts used were wood timbers. Struts have been around for thousands of years, but it wasn't until recently that they started to become popular in the rescue field. There are two reasons for this. First is the evolution of motor vehicles from "bricks" to "beach balls" which has eliminated much of the effectiveness of traditional cribbing. The second is the development of advanced materials such as high strength Aluminium (Aluminum) and advanced composite materials such as Kevlar Structural Composites. These have allowed equipment designers to build extremely strong Struts which are light weight and do not take up much room on already overloaded apparatus. These materials have also given manufacturers the ability to produce Struts that both stabilize loads and lift/support loads.

Today's Strut systems generally fall into four categories, with price and load capacities increasing as you advance:

- **Wood Shoring:** Easy to make shorter, hard to make longer. Very inexpensive but bulky to store. Not versatile and very cumbersome to use. Systems are available for capping ends and attaching ratchet straps. Some brand names: Z-Mag and Cappa BearClaw
- **Props:** Small diameter steel telescoping tubing. Good starter tools. Limited load capacity

(typically 2000-5000 lb / 907-2268 kg). Good for preventing a light vehicle from tipping over, but not capable of supporting advanced rescue loads. Small size makes them easy to store. Some brand names: Stab-Fast, Quick Strut, Rut Strut, Junkyard Dog.

- **Stabilizing/Lifting Struts:** Steel signpost material or Advanced Composite materials. Load capacity (depending on brand) varies from 4,000 lb/1,814 kg up to 18,000 lb/8,165 kg. These Struts also have jacks which can be used to aid in lifting loads or cribbing behind airbags/lifting bags. Specifically designed for vehicle, machinery, aircraft and light structural rescue but small enough to store easily. Brand names: Rescue 42 TeleCribs, Res-Q-Jack.
- **Heavy Rescue Struts:** Loads in excess of 40,000 lb/18,144 kg. Primarily designed for building collapse and trench rescue. Although cumbersome, these Struts are easily strong enough for common vehicle rescue, and are best for heavy vehicle rescue. Large size requires a lot of storage space. Brand names: ParaTech, Airshore, Holmatro, Prospan.

** Not all strut brands are available in all countries*

Which one is right for you? Wood shoring is extremely inexpensive and is better than nothing. Prop type Struts are sufficient for departments who do not see many vehicle accidents and have another Rescue group that can bring in more advanced equipment for difficult jobs. Stabilization/Lifting Struts meet the needs of most vehicle Rescuers and are typically carried by those who carry hydraulic rescue tools and airbags (lifting bags). Heavy Rescue Struts are typically carried



By widening the base of the stabilization triangle, we create a safer working environment and allow ourselves greater patient access

by Rescuers who are trained for large building collapse or trench rescue.

Whichever type you choose, to do a good job with today's "beach ball" vehicles you need Struts!

Where to Start?

- Visit the web sites of the Strut manufacturers. Note that not all brands are available in all countries.
- View an online tutorial video on Struts. <http://www.rescue42.com/video.php>
- Have your local equipment suppliers bring Strut systems in for you to test. Assess all struts that are available to you based on your location. Pick the one that best meets your needs, space requirements and budget.
- Train with your equipment until you are proficient.

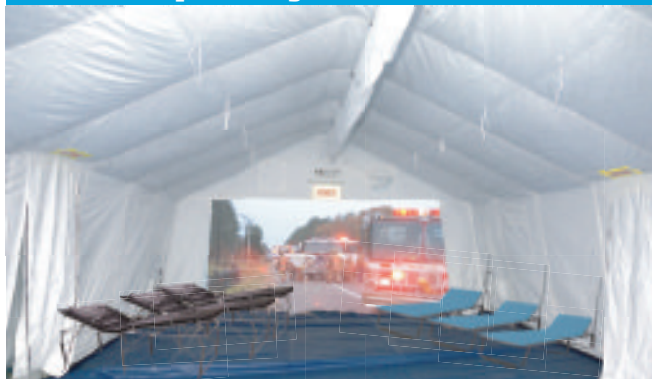
The evolution of vehicle design demands changes in rescue techniques and tools. Your responsibility as a Rescuer should include vehicle stabilization in order to maintain a safe working environment for you and your crew as well as safeguarding patients. To that end, Struts should be considered an essential tool in modern vehicle rescue.

IFF

Tim O'Connell is an ex-nuclear submariner in the US Navy and has been a Firefighter for over 26 years. He holds technician level certification in vehicle extrication, trench rescue, heavy rescue, swiftwater rescue, confined space rescue and high angle rescue. He teaches numerous extrication classes throughout the western USA. Tim is also the president of Rescue 42, Inc., a manufacturer of advanced rescue and firefighting equipment.

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Rachel Dowling-Brown, Angloco's production assistant standing in front of a YTV (Youth training vehicle)



Fire-fighting vehicles from Angloco Ltd

By Mark Bathard

Seven miles southwest of Leeds in West Yorkshire, lies the historic town of Batley which, over the years has been home to a few famous names such as Joseph Priestly, Josiah Wedgwood and the rock singer Robert Palmer. The name Batley is derived from a Danish word which when translated literally means valley or homestead of Bats. Sited next to the historic train station in Batley is a company whose history is as impressive as the town that it comes from.

Angloco Ltd designs, manufactures and supplies fire-fighting and rescue vehicles and equipment. It has customers in over 40 countries world-wide, supported by comprehensive after-sales service and spare parts back-up.

Angloco has been designing and building special purpose fire fighting and rescue vehicles since 1974 which makes it the longest established builder of fire fighting vehicles in the UK. It has also provided it with a wealth of experience and capabilities.

The majority of vehicles are specially designed and custom built for each customer, according to their individual requirements. Angloco proposes an optimum solution for each application, in light of the needs in each case.

Equipment Distribution and Support

In addition to the vehicles it designs and builds at Batley it also supplies complete vehicles built by two of its larger continental European principals i.e. aerial ladder platforms, and com-

bined aerial rescue pumpers from Bronto, and ARFF (airport rescue and firefighting) vehicles, and a variety of special pumpers from Rosenbauer International.

Angloco also supplies fire fighting and rescue components, equipment and accessories, including: portable and vehicle mounted pumps, fire service ladders, hydraulic rescue and extrication equipment, portable systems, branch pipes and nozzles, foam equipment, waterway couplings fittings and adaptors, rescue boats, electrical equipment and accessories, etc.

In support of its products and vehicles, Angloco has a dedicated after-sales service and spare parts department. To give an indication of the significance to this Department to the Company's growth it employs 20% of Angloco's team members. In addition to carrying out on-location commissioning and training, it has experience in servicing and major refurbishment projects overseas at customers' premises, as well as throughout the UK.

Angloco vehicles
completed for two
refineries towards the
end of 2009



Reputation

Angloco's reputation for quality, experience, attention to detail, after-sales service and customer care has resulted in an extensive national and international customer base, and this has been recognised by international business awards in 1999, 2002 and 2004.

International Fire Fighter's Mark Bathard visited Angloco for the day to see firsthand, what goes on in this thriving company.

Alistair Brown, Angloco's sales and marketing director and son of Managing Director Bill Brown took me to one of their conference rooms which also doubles as a training room to explain Angloco's history.

It all started back in 1965 when the company started as Anglo Coachbuilders Ltd founded by Tony McGuirk (No relation to the current CFO of Merseyside). The Company back then was primarily involved in "jobbing" coach building, repairs and the occasional mobile library. In 1972, the company moved from their premises in Morley to the current site in Batley. In 1974, Angloco Coachbuilders entered the fire vehicle

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market having appointed Bill Brown as their Managing Director from Hestair Ltd who were the owners of Dennis Specialist Vehicles. The first of the company's expansions took place in 1977 when a new production shop was completed. In 1979, the company name changed to Angloco Ltd and in 1980 to cope with increased demand, the production shop was extended further.

The 1980s really saw change within Angloco. In order to broaden its range of products it was appointed UK and Ireland's distributor for Metz's turntable ladders in 1982. The second distributorship came from Bronto for their range of aerial fire fighting and rescue platforms in 1988, with the third one occurring in 1990 when Rosenbauer International appointed Angloco as its partner to distribute its vehicles and equipment in the UK and Ireland. In-between in 1986, a management buyout took place by Bill and Julie Brown.

The 1990s were also very busy times at Angloco. In 1996 they won, at that time, their largest export order, (for Bahrain) and just three years later in 1999, won an award from the D.T.I. and Foreign Commonwealth Office for being S.M.E exporter of the year. In those less-straightened times, with the award came prize money in excess of £12,000! This was to be the first of many awards for the company.

The 2000s saw even more activity within Angloco and more awards. In 2002, the International Business Awards event (sponsored by Trade Partners UK), announced Angloco as the winner for "Product Innovation of the year". Just two years later in 2004, the International Business Awards (sponsored by UKTI), declared Angloco the winner of the category "Against All Odds". Once again, more space was needed due to the ever increasing size of the company's order book and a new office extension was built in 2004.

Germany's Rhienmetall Defence Electronics GmbH appointed Angloco as their distributor for their "Blue Light" training simulators in 2006 whilst in 2007, Gunzburger Steigtechnik appointed Angloco as their UK and Ireland partner for



A small range of the rescue tools made by ResQTec® available through Angloco

their range of fire service ladders. In 2006, German foam manufacturer, Dr Sthamer formally appointed Angloco as their distributor of foam products. Dr Sthamer are the largest manufacturer of foams in Europe. In the same year, Angloco were also appointed by ResQTec as their distributor for their range of rescue products.

To finish off the latter part of the 2000s, which saw many companies around the globe struggling due to the recession, 2009 was a record year for Angloco achieving record sales, profits and exports. Their 2010 order book is the largest ever which also includes £6m of exports.

Vehicle design to customer specifications is something that Angloco prides itself on. The second part of the tour was to the offices of the design and development department. State of the art computer programmes and machines can design the vehicle exactly as the customer has specified and when the design process has been completed, the customer is then invited to look at the diagrams to make sure that everything is as they specified. Work will not start on a vehicle until the design team and the customer are 100% satisfied.

The next part of the tour was where it really all happens, the workshop. This was a busy week for all employees of Angloco as the Christmas holidays were approaching and quite a number of vehicles were due to be completed and delivered before the year end. Joining Alistair and myself on the factory floor tour was Angloco's production assistant, Rachel Dowling-Brown. She explained where some of the vehicles were going to be delivered, which included destinations as far apart as Trinidad and Qatar, but also explained some of the newest developments in vehicles. One of the smallest and least sophisticated vehicles that was ready to be delivered, which is one of the latest additions to the Angloco range is the YTV (Youth Training Vehicle). This is built using a standard panel van, converted to allow for a crew cab, and houses a small tank, pump, hose and branch, ladder etc. Due to the ever increasing attacks on fire crews when they attend incidents, especially in deprived communities, the YTVs are designed to teach youngsters the importance of fire safety as well as highlighting just how important the role of the firefighter as well as their equipment really is. Young people can not only see how the vehicle is used but are able to gain some experience in



Alistair Brown, Angloco's Sales & Marketing Director holding a rescue tool manufactured by ResQTec®

This ARFF tender is due to be shipped to Afghanistan after a complete rebuild and "desertisation" enhancement



operating the fire equipment and extinguish a small fire. Already, West Yorkshire Fire and Rescue Service have these YTVs in their fleet and interest is forthcoming from various other brigades around the UK as well as overseas.

Angloco has never forgotten its grass roots and at one end of the workshop, an MoD ARFF (Airport Rescue and Firefighting) vehicle which is undergoing a mid-life refurbishment and "desertisation" upgrade for service in Afghanistan. This involves a complete strip down to its bare chassis and a rebuild with many enhanced performance features. Alistair explains that although the majority of Angloco's business is in new build and after sales service, there is still a regular call for

refurbishment work which remains an essential part of Angloco's range of services.

In order to keep their customers aware of any new developments in the fire industry, Angloco frequently holds demonstration days where customers can see and experience firsthand, new technology being put through its paces. More recently these demonstration events have taken place at The Fire Service College, Leeds Bradford International Airport and of course, at the Angloco premises. These demonstrations have included large scale pan fires and the use of an airport's A.R.F.F. vehicles to demonstrate the extinguishing capabilities of fire fighting foams a report of which can be read in the November 2009 issue of *International Fire Fighter Magazine*.

To summarise, after the end of a comprehensive tour of the Angloco facility and an informal and very interesting conversation with the company's Managing Director, it is plain and very comforting to see that wherever you are in the UK or for that matter, overseas Angloco can assist, deliver and offer an unrivalled service to keep anyone involved in the fire industry abreast of the latest technology as well as offering products that will enable fire fighters from around the globe to do their job well but most importantly, safely.

IFF



For more information about Angloco and its range of products:

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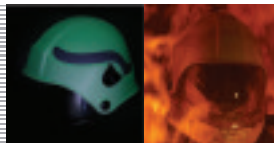
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Vehicle Fires - Stopping Them In Their Tracks

By Nick Grant

EMEA General Manager,
Firetrace International

A vehicle fire can swiftly result in considerable financial loss and pose a serious threat to the lives of the vehicle occupants. They need to be stopped in their tracks, as Nick Grant explains.

Vehicle fires are far more common than many of us realise. They can – especially on passenger-carrying buses and coaches – have a devastating life-threatening impact. Fire can cost the off-highway vehicle owner a great deal of money, and jeopardise the company's ability to continue to provide the level of service to which it is contractually committed. The latest figures speak for themselves.

While the most detailed documented research applies to the USA, it is surely reasonable to presume that the findings are replicated around the world. US research shows, for example, that during 2006, US fire departments responded to an estimated 278,000 on-highway vehicle fires involving cars, trucks and recreational vehicles, around 70 percent of which were passenger-carrying. These fires caused an estimated 490 deaths, 1,200 injuries and cost \$1.3 billion in direct property damage. In fact, according to estimates based on a US Department of Homeland Security NFIRS

(National Fire Incident Reporting System) and NFPA (National Fire Protection Association) survey, between 2002 and 2005 highway vehicle fires accounted for 18 percent of all reported fires in the USA.

While off-highway commercial vehicle and heavy equipment fires are numerically fewer than for on-highway vehicles, the potential for financial loss is often substantially greater. Construction and agricultural equipment – such as log haulers, harvesters, excavators, shovels, draglines, haul trucks and wheeled loaders – costs hundreds of thousands of dollars. They can also take months to replace and their severe damage or destruction can have a serious detrimental impact on project timescales. Statistics show that agricultural equipment such as balers and choppers are most at risk, accounting for 43 percent of off-highway vehicle and equipment fires, followed by construction vehicles, then industrial loaders, fork-lift trucks and stackers.

**The heart of the matter**

The common thread that links all of these vehicles, again according to the findings of NFIRS/NFPA, is that mechanical and electrical failures or malfunctions account for the majority of fires – around 60 percent in the case of off-highway equipment, rising to 75 percent for on-highway vehicles. The most common location for the outbreak of a fire – in something like 60 percent of the cases – is in or around the engine compartment, the running gear or wheel areas.

The conclusion that can be reasonably drawn from these figures is, therefore, that these are the areas most in need of detection and suppression

percent of the items first ignited in a fire, together with grass, sawdust and wood chippings.

Targeted protection

While these risks can be lessened by regular and diligent maintenance and cleaning, engine fires will remain a constant threat and effective engine compartment fire detection and suppression is clearly the only dependable means of ensuring that a minor fire does not escalate quickly into a destructive conflagration.

The dynamics of the airflow in and around an engine compartment when a vehicle is in motion can seriously impair the performance and reliability

To be truly effective, a vehicle fire protection system needs to have a number of characteristics. It must be able to deal with the problem of airflow, react immediately a fire breaks out and suppress it before it has any opportunity to spread.

and where investment in fire safety measures are likely to have the greatest payback. However, the real nature of the fire hazard has to be taken into account if the detection and suppression solution is to offer the maximum protection.

In addition to the vehicle's fuel and the risk of fuel line ruptures, there are any number of flammable liquids present throughout any engine compartment. These include hydraulic, brake, automatic transmission and power steering fluids, plus combustible accumulated grease on the engine block, for which frayed or damaged electrical wiring can easily provide the ignition source. However, some combustible materials are vehicle or equipment specific. These include agricultural crops that, surprisingly perhaps, account for around 15

of traditional detection and suppression techniques such as fusible link systems. This is because heat and flame that typically rise from the source of a fire may be propelled away from the location of the fusible link by the motion of the vehicle, delaying its activation. The inevitable build-up of dirt in and around engines, vibration and intense temperature variations are also factors that are known to cause traditional detection and suppression systems to fail to provide the essential fast and accurate fire detection and suppression.

So, to be truly effective, a vehicle fire protection system needs to have a number of characteristics. It must be able to deal with the problem of airflow, react immediately a fire breaks out and suppress it before it has any opportunity to spread.

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The solution must also be effective on every type of fire risk that is likely to be present, be able to withstand harsh dust-laden environments, contend with extreme ambient temperatures, and stand up to intense vibration.

Fast response

Firetrace International's response to these challenges is called FIRETRACE®. It is an automatic, self-seeking fire extinguishing system; one that requires no power source and comprises an extinguishing agent cylinder that is attached to polymer tubing via a custom-engineered valve. This proprietary Firetrace Detection Tubing is a linear pneumatic heat and flame detector that is immune to the vibration, shocks and temperature extremes found in engine and generator compartments. It was specially developed to deliver the desired temperature-sensitive detection and delivery characteristics in even the harshest of environments.

This leak-resistant tubing is routed throughout the engine compartment. Immediately a fire is detected, the tubing ruptures and automatically releases the suppression agent, extinguishing the fire precisely where it starts and before it can take hold. The tubing is placed both above and behind the potential source of the fire to ensure that the airflow actually helps by directing the heat and flames towards the tubing, providing faster and more reliable detection and suppression in moving vehicles. Depending on the particular FIRETRACE system that is chosen – either Direct Release or Indirect Release – the suppression agent also flows through the delivery tubing to the front of the engine, again working with the airflow to flood the entire compartment.

The Direct Release System utilises the Firetrace



Detection Tubing as both the detection device and the suppressant delivery system. If a fire breaks out, the tube ruptures nearest the point where the most heat is detected, forming an effective spray nozzle that releases the entire contents of the cylinder to suppress the fire. The Indirect Release System uses the tube as a detection and system activation device, but not for the agent discharge. The rupturing of the tube results in a drop of pressure causing the indirect valve to activate. This diverts flow from the detection tube and the agent is discharged from the cylinder through diffuser nozzles, flooding the entire engine compartment.

All FIRETRACE systems are available with a manual release or an “alert” signal light and a horn that can be mounted on the operator’s dashboard or control panel.

Agent selection

The FIRETRACE extinguishing agent cylinder is usually mounted inside the engine compartment and choosing the correct agent is vitally important. While the vehicle’s fuel is a Class B fire risk, carbonaceous debris around the engine, such as leaves, straw, and crop residue, is a Class A hazard, plus there is the potential for European Class C fire risks involving flammable gases to be present (in the USA the European Classes B and C are combined into a single Class B category). This precludes the use of some suppression agents for these applications; indeed, it rules out some tube-based systems that rely solely on the use of CO₂, which is suitable only for European Class B fires.

While clean agents such as DuPont™ FM200® gaseous suppression agent or 3M™ Novec™ 1230 Fire Suppression Fluid have the essential

firefighting characteristics that the hazards demand, ABC dry chemical suppressant is by far the most appropriate choice for these applications as it is ideal for all three classes of fire.

Advocates of watermist systems often contend that dry chemical powders are corrosive. However, the powder particles are of such a size that they will not penetrate the engine, turbocharger or air filter, and it is recommended that, after agent discharge, the affected compartment is jet washed or compressed air cleaned to remove any powder residue. In reality, such is the reliability of the FIRETRACE system that this clean-up only has to take place after a justifiable discharge that occurs when a fire breaks out.

By comparison, watermist systems are prone to

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leaking and accidental discharge and have to incorporate antifreeze in order to operate in all climatic conditions. Antifreeze is a combustible liquid that is itself a corrosive substance.

Solution reliability

If an engine compartment fire is allowed to take hold the likelihood is that the entire vehicle will be destroyed. So, while selecting the right type of detection and suppression system is important, so too is ensuring that it has the verifiable endorsement of internationally renowned and independent accreditation and approvals agencies. Top among these for any application are UL (Underwriters Laboratories), FM (Factory Mutual), CE (Conformité Européenne or European Conformity) marking. However, there are also several application-specific approval bodies, such as those for buses and coaches that include the Danish Institute of Fire & Security Technology and the Swedish Fire Protection Association.

Vehicle fires choose their own time and place, and are by no means limited to older vehicles. They are also no respecter of cost-cutting exercises, inappropriate suppression agent selection, or the decision to install a system that does not come with the endorsement of credible approvals and accreditations. Too much is at stake, as the NFIRS/NFPA survey confirms with the finding that in 2004, more people died in vehicle fires than from apartment fires, and vehicle fires caused roughly seven times the number of deaths caused by non-residential structure fires.

IFF

Nick Grant is ISO 9001:2008 certified Firetrace International's EMEA General Manager

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Pic courtesy of Reuters

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The Airbus 380 while at Dulles in March of 2007 with the new Tower in the background



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Department**

In late March of 2007, the Airbus 380 (A380) made its only visit to Washington, D.C. at Washington Dulles International Airport

The visit of the new large aircraft was to give airport personnel and stakeholders the opportunity to see this aircraft up close and personal for future planning purposes. The A380 spent two days at the airport, providing airport stakeholders the opportunity to physically put their hands on the aircraft to familiarize them on its features.

Washington Dulles International Airport

Washington Dulles International Airport is located 26 miles west of Washington D.C. The airport opened in November of 1962. Dulles International and Ronald Reagan Washington National Airport make up the Metropolitan Washington Airports Authority (MWAA). MWAA was formed in 1987 through legislation by the Commonwealth of Virginia and the District of Columbia and given a fifty year lease from the federal government to operate both airports, which were two of the last three federally operated airports.

Washington Dulles is an E Index Airport (Category 10 ICAO). The airport has four runways for aircraft operations (12/30, 19L/1R, 19C/1C and 19R/1L). In addition to the Main Terminal, there are four passenger concourses for flights. The

airport averages over 1,000 aircraft movements per day and last year nearly 24 million people passed through Dulles. Dulles has over 30 air carriers including a large presence from United Airlines, which has a Hub at Dulles. Dulles also has cargo operations and a large general aviation presence. Because of the size of the airport, length of the runways (three runways are 11,000 feet in length) and the ability to have simultaneous operations, Dulles often receives diverted flights for weather situations and emergencies. In addition, Dulles Airport is one of the few airports on the east coast that has additional land to be developed for future use, including another runway and additional concourses.

A large capital construction project (CCP) is underway at Dulles. The large ticket item for this project is an underground train system. The underground train system or AeroTrain, will replace a majority of the mobile lounges that currently move passengers to and from the Main Terminal to the concourses. The AeroTrain system will be online in the first quarter of 2010. Once the project is online, the AeroTrain will have the ability to move passengers between the concourses in under three minutes. A new air traffic control tower (ATCT)

was completed in 2007 and stands at 335 feet, capable of viewing the entire expansive airfield.

Another jewel of Dulles Airport is the National Air and Space Museum Annex (NASM). In 2003, the Smithsonian Institute opened the museum and it is home to over 200 aircraft and exhibits including the space shuttle Enterprise, Enola Gay and SR-71 Blackbird that set the speed record. The museum is currently expanding its facility to allow for additional exhibits that have been donated to the Smithsonian Institute. The NASM has an observation deck which allows for visitors of the museum to watch aircraft operations at the airport and an IMAX Theater.

The Dulles Access Road is a 16 mile long highway that begins at I-66 and runs to the airport, connecting Washington, D.C and the airport. Airport maintenance personnel take care of the highway and are responsible for surface maintenance, snow removal and landscaping. In



Mass Casualty Support Unit (MCSU 362) supports MCI Incidents. The Unit is capable of treating 200 patients (100 on each side)

November 2009, the Airports Authority took over operation of the Dulles Toll Road, which is a separate highway adjacent to the Access Road. The access and toll roads now fall under one

The underground train system or AeroTrain, will replace a majority of the mobile lounges that currently move passengers to and from the Main Terminal to the concourses.

umbrella and the toll revenue will help to support the construction of the Washington D.C. Subway System (Metro) to Dulles. The Metro construction has begun and is rapidly progressing. The majority of the Metro expansion will be constructed in the median of the Access Road to the airport, above ground until it gets to the airport and then underground.

Fire and Rescue Department

The MWAA Fire and Rescue Department consists of a force of 153 personnel and is commanded by Fire Chief Gary Mesaris. The personnel are split between Washington Dulles, Ronald Reagan

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Washington National Airport and Headquarters Staff. Washington Dulles currently is assigned 84 personnel, split into three shifts. Each shift has 28 personnel assigned with minimum staffing of 24 personnel at all times. Apparatus staffed at Washington Dulles include: Battalion Chief/Shift Commander & Shift Commander Support, 4-3,000 Gallon Foam Units (2 personnel each), one Rapid Intervention Vehicle (1 person), two Structural Engines (4 personnel each), two Advanced Life Support Ambulances (2 personnel each) and one EMS Supervisor (1 person). Minimum staffing includes four fire operations officers and three advanced life support providers.

Fire Station 303 is located on the street side of the complex, on the North side of the airport. This station houses one structural engine, a ladder truck one ALS ambulance and the EMS Supervisor.

Dulles airport has three fire stations. Fire Station 302 is located on the South side of the airfield and houses the battalion chief, two foam units, rapid intervention vehicle, one ALS ambulance and one structural engine that are staffed. In addition, Fire Station 302 houses a Foam Support Unit, Hazardous Materials Support Unit, Decontamina-

tion Unit, Special Operations Unit (Hazardous Materials Unit/Technical Rescue) and Tunnel Rescue Unit. The station opened in 2002 and staffing consists of 14 personnel.

Fire Station 303 is located on the street side of the complex, on the North side of the airport. This station houses one structural engine, a ladder truck one ALS ambulance and the EMS Supervisor. Fire Station 303 opened in 1996 and seven personnel are assigned to this station per shift.

Fire Station 304 is located on the West side of the complex and is the primary response to the West side runway (19R/1L). This station houses four personnel per shift with two Foam Units. The station opened in 2008. In addition to the four shift work personnel that are assigned here, the Dulles Deputy Fire Chief, Battalion Chief of Special Operations and Dulles Training Captain have their offices in this station.

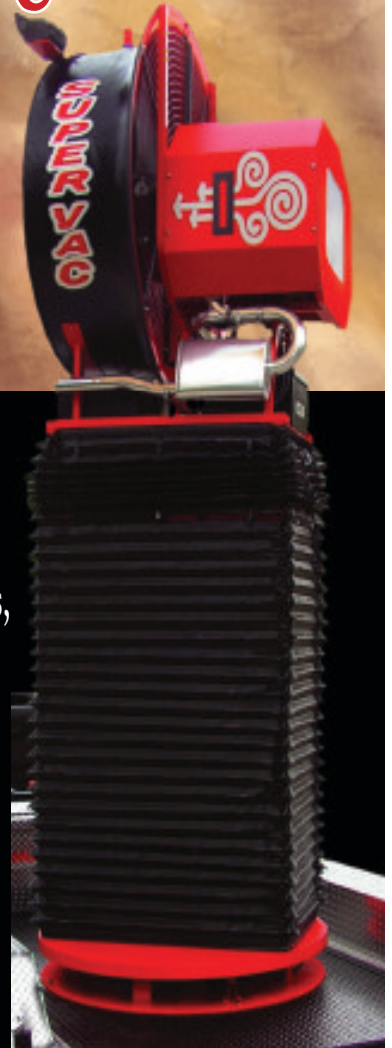
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Our Two Oshkosh Strikers posing in front of the newest Air Traffic Control Tower (ATC)



Planning for the Airbus 380

The MWAA Fire and Rescue Department first became aware of some of the A380 issues related to its size in 2006 when Deputy Chief Lasher and I attended the ARFFWG/IAFPA Joint Conference in Toronto. At that time, Airbus personnel gave an excellent presentation on where the program is and where it is headed. For us, this gave us a great start as they provided training materials to the participants. We also were told that the aircraft would be visiting in the spring of 2007. From the training materials that were given, the Safety & Training Division prepared classes to be delivered to shift personnel in early 2007.

Planning for the Airbus 380 began in early 2007 when a committee was formed to explore the issues that the Fire and Rescue Department would be faced with when this and other new large frame aircraft started to arrive at Dulles.

Because of the size of Dulles airport, we already receive other large frame aircraft (B747, B777) and this tremendously helped our case in adding additional personnel and equipment. The Fire and Rescue Department has ordered and is expected to take delivery of a Pierce 100' tower ladder in the spring of 2010. We also took delivery of two 3,000 gallon Oshkosh Strikers last year, one of which has a Crash Rescue 50' High Reach Extendable Turret. The main purpose of this was to be able to provide an elevated waterway for the larger aircraft and also for the piercing capability.

On the day that the A380 arrived at Dulles, personnel were invited by Airbus to visit and tour the aircraft. The Airbus personnel were a tremendous resource and very hospitable to all public safety personnel. A United Boeing 747 was parked in the holding space next to the A380. For fire and



The Airbus 380 parked next to a United Airlines Boeing 747



Another picture of the Airbus 380 with our Engine 380 in front

rescue personnel, it gave a true perspective on this side of both aircraft in comparison.

The A380 is scheduled to start flying into Dulles next year. Some of the training that is being conducted or planned includes:

- Additional mass casualty incident management exercises including increasing our capability to manage our triaging and treatment of a larger number of patients at this year's triennial exercise.
- Currently delivering a large frame aircraft familiarization class to shift personnel with special emphasis on the larger frame aircraft.

Airport Readiness & Improvements

Dulles Airport was initially identified as an airport that was nearly ready for the arrival of the A380. The runways and taxiways were already available to receive the A380. One area that was not ready was the jetways, as no current jetway could handle the aircraft. As of October 2009, construction has begun at B Concourse with the jetway upgrades. Those upgrades are expected to be completed in the early part of the winter and well before the arrival of the aircraft next year. Another concern for the airport was how the aircraft would stand up on the airport's surface areas. All of the

The Airbus personnel were a tremendous resource and very hospitable to all public safety personnel. A United Boeing 747 was parked in the holding space next to the A380. For fire and rescue personnel, it gave a true perspective on this side of both aircraft in comparison.

- An advanced agent application course is being developed for the larger aircraft to include not only the mass application of extinguishing agent from turrets but also advancing hand lines into the larger aircraft. Each Dulles Foam Unit has a hand line for larger frame aircraft (300' line- 100' of 3" line to a gated wye with another 200' of 1.75").
- An advanced aircraft evacuation and search & rescue course is also being planned so that fire and rescue personnel are ready for the challenges of access to entry and exit points of larger frame aircraft, including the A380.

taxiways and runways at Dulles are 36" thick and will be able to support the aircraft.

Closing

Washington Dulles International is poised to receive the A380 next year. The MWAA Fire and Rescue Department is excited to have this aircraft coming to our airport. Because we had an opportunity to see the A380 in person, it truly gives us some perspective how massive it is and the challenges that it brings to our department and the airport itself. We look forward to seeing this aircraft on a regular basis.

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A blow out with a venturi attached to bring the flames well above the well head



Emergency Response Planning in the Oilfield

By John Walters

Recently I was approached with the question, “What makes a good Emergency Response Plan and how is the plan utilized in the oilfield?” I had to ponder the question for some time.

In our business we deal with the Blowout Contingency Plan (BCP) which is supposed to be a subset of the bigger Emergency Response Plan (ERP). More often than not our BCP is a more comprehensive document because we deal with emergency situations for a living and have developed an extensive list of equipment, concepts and other incident management processes. We utilize an Incident Command System (ICS), by which we document and map the typical response process in such a manner as to make it fairly simple for the organization to understand and implement. Basically we describe how to help us do our job better, which as a result achieves the goal of getting the situation back under control.

The biggest advantage for us is we live and breathe emergency response, and we have pretty

much seen it all. When we facilitate the development of an ERP or BCP for a company, it always amazes me how the company's involvement can vary – from no involvement at all to completely changing a proven system to fit into the company's model, and how proven concepts on incident management are challenged. Typically we will hear, “During normal operations we notify these individuals and conduct this procedure, and so we need to follow those protocols.” Hopefully emergency response operations are not “normal” for your organization, so adjustments have to be considered and recognized for a successful outcome.

Purpose

The object of an ERP is to establish a common framework for developing local response plans for



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the various operations carried out by companies. For that it provides recommendations, guidelines and technical documentation, based on industry common practices, to assist the different industry operations to create the specific ERP.

These guidelines develop the requirements and the minimum contents for the local ERP. *One of the biggest items that I see is companies trying to fit their organization into the ICS. This document should be able to be picked up and utilized by everyone familiar with the ICS. Consideration of what agencies, companies, etc. need to be involved and their respective roles under the plan need to be clearly understood. Changing the Incident Commander to "Director of Whatever" can be confusing, especially to organizations outside of your company, and can cause delays in organizing a response. ICS is standardized for a reason. Making reference that the Incident Commander role will be the responsibilities of position X is acceptable, however keep it within the ICS framework. Recently Boots & Coots was asked to develop a flowchart that incorporated the company structure. By the time it was complete the chart was so complicated that no one could track who did what and who reported to whom. The company liked it because everyone was involved,*

- Initial (48 hr) response actions
- Guidelines for strategic control plans
- Guidelines for daily tactical action plans during emergency operations
- Critical response resource requirements and availability
- Issues that may adversely affect response and recovery

Ownership and control

The ERP should be a controlled document. It is owned by the company, who is responsible for its distribution and amendment.

ERP goals

The end goal of the ERP is to create a local guide to ensure, in the event of an emergency response incident, that an organized response for emergency is brought swiftly and efficiently into action.

The ERP should provide, as a minimum, a working methodology to safely and effectively manage the operations necessary to regain control of a situation under local conditions. This would include the initial response, covering the time from after evacuation until dedicated response teams are formed and response specialists have arrived on location, and managing the control of opera-

The object of an ERP is to establish a common framework for developing local response plans for the various operations carried out by companies.

however responders didn't like it because there was no clear decision maker. In the oilfield or any emergency situation that can be major problem because time is critical.

Application

The framework established is applicable for a local ERP for the various operations carried out by a company.

Emergency response management system requirements

Adequate emergency response plans and procedures should be in place prior to commencement of operations, and should be in compliance with a company's HSE Contingency and Emergency Planning requirements. *This is another area of concern – companies requesting an ERP without providing sufficient time to develop the plan. We run into this quite a bit, "We are due to begin operations in 20 days and we need a response plan." In the corporate world of development, reviews, revisions and final acceptance, it is difficult to develop these programs in the timeframe demanded. The larger issue is understanding the plan. If possible the plan is completed in time, then it is just sent to the field, without educating the end user and drilling crew to see if there are issues. This can prove disastrous and costly in terms of safety and economics.*

More specifically, for each hazardous operation there should be an ERP in place that will provide guidelines for managing an emergency operation. It should contain:

- Emergency response organization and responsibilities

tions thereafter until recovery is complete. The ERP sub-goals are to provide local guidance for:

- Safeguarding human life. When primary control is lost, it is essential to control site safety; safety of third parties within a defined exclusion zone and the safety of those directly involved with the response operations.
- Activating an organization that demonstrates "Command and Control" of the incident response in the eyes of the public, personnel, partners, insurance underwriters and contractors.
- Initiating actions that will mitigate escalation to minimize damage to the environment, assets and company reputation.
- Understanding your exposure to potential response problems unique to your local operating environments, to minimize lost time discovering them during an actual emergency.

ERP objectives

The primary objective of the ERP is to provide clear concise guidelines, compatible with a company's tiered emergency response system, to specifically assist the local response team in managing the various operations required for regaining control of an emergency. More specifically, it:

- Defines the local Emergency Response Team (ERT) functional organization with its position in the overall Incident Management Team (IMT) and on-scene Tactical Response Team (TRT). The organization should:
 - Be structured for command and control. The ICS is a good model for IMT organization.
 - Be designed to expand and contract depending on the circumstances of the incident. A functional organization defines roles and

responsibilities, and it is not always necessary for different people to fill various functional roles. If the incident is small, for example, one person may take responsibility for several functional positions in the ERT organization.

- Define the reporting structure and communication procedures
- Define the responsibilities and guidelines for ERT functional positions
- Defines initial response (after evacuation) and emergency response project planning guidelines for the ERT leaders both on-scene and off-scene. This objective maps the typical steps historically followed in regaining control of an emergency.
- Defines task guidelines for each of the key ERT functional positions. This objective is primarily for employees and contractors who hold functional positions in the ERT. It is not necessary to define how emergency response specialists perform their jobs (e.g., details on capping techniques) other than for information purposes.
- Defines daily project execution guidelines for emergency response operations to demonstrate command and control. This should include ERT

authorities, the partners, families and media

- The consequences of the emergency (medical, medi-vac, pollution control, etc.)
- The emergency procedures for contracting, administration, procurement, etc.

Legal and regulatory requirements

The specific requirements in case of an emergency from the local regulatory authorities or from the contractual framework for the company should be integrated in the ERP:

- Legal requirements for the ERP content (i.e. control of fire water, tank capacities, contents, well flow simulations, design of relief wells, etc.)
- Legal requirement for equipment availability (for fire fighting, for relief wells, for capping operations, etc.)
- Interfaces with the systems set up by the local authorities in order to respond to an emergency

Communication and training

The ERP should be communicated to all relevant parties including the response contractor.

The users of the ERP should be familiar with all other relevant related corporate policies.

Although the oilfield is a different work environment the basic response strategies are the same. The Incident Command System needs to be utilized and needs to be communicated through training and drills.

meeting schedules, typical agendas and written work instructions for the next operational period.

- Pre-defines basic problems that may make regaining control of a blowout in your operating areas unusually difficult with plausible solutions.

This information would come from high level risk/hazard assessments with respect to emergency response control and recovery. This might include issues such as logistics, security, weather and environment, limited personnel, high potential blowout flow rates, HPHT, H₂S, water depth, kill equipment requirements (HHP and flowrate), kill platform and mud requirements, crane barge, inaccessible wellbays, availability of water, pumps and monitors, pollution control, proximity to third parties, surface and subsurface constraints and hazards for relief wells, spare casing and well-heads, capping issues, etc.

This data would be kept in appendices and used by the ERT in the initial planning phase.

Scope of the ERP

The ERP should cover the activities to be carried out to assess the incident and to plan and execute appropriate response measures to ultimately regain control of the emergency situation. The ERP should take into account the specific operational environment and the local context of the particular company.

The following items are typically covered in the overall ERP:

- The security problems and political crisis
- The communication procedure with the local

The personnel (including deputies) who may be involved in the management of an emergency situation should be fully aware of their role.

The efficiency of the ERP needs to be systematically tested and improved through periodic drills. *This is the biggest shortcoming of most companies. Not enough drills are conducted to train and educate the end user of the document.*

ERP updating

An effective ERP is updated as necessary to incorporate changes and lessons learned. Likewise, the nominated personnel and the contact information on the BCP should be updated regularly and before any drilling/work-over campaign or major personnel change. *This is another area of concern. Once an ERP is completed it needs to be updated with some relevant schedule in order to maintain its integrity and usefulness.*

Conclusion

Although the oilfield is a different work environment the basic response strategies are the same. The Incident Command System needs to be utilized and needs to be communicated through training and drills. Communication needs to be considered and everyone needs to know who is in charge. The system needs to be uniform so no matter who picks up the plan they can understand. In essence the ERP for the oilfield is not any different than ERP's for other industries and should be constructed with the same considerations.

John Walters has spent the last 19 years in the Emergency Management business. John began his career in the US Navy in 1991 as a fire-fighter. After serving his country he was honourably discharged and joined EmTech Environmental Services as a Hazardous Materials Specialist until 1996. John was trained in industrial fire fighting and specialized in marine fire fighting and has worked as a consultant for multiple companies. John later joined Boots & Coots in 1998 where is currently the Regional Manager for Boots & Coots Risk Management Services division.

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Crash Rescue

By Bernard Valois

The modern day, truly effective fire department needs more than the well trained professionals and their pumpers. It now requires state of the art equipment to do the job.

It has always taken great people to bring new technologies to life, people with vision, patience and perseverance, the ability to adapt, and the resources to turn a concept into reality.

As a veteran aircraft rescue fire fighter, I would like to help tell a brief story about the people, fire-fighting technology, and the remarkable expansion of **CRASH RESCUE EQUIPMENT SERVICE, INC.** in Dallas, Texas, which for over 40 years has been one of those truly great companies that actually listens to professional firefighters. They have researched, designed and over several decades, continuously refined some outstanding tools that have allowed us to do our often dangerous jobs much faster and safer.

Introduction

Crash Rescue's beginnings go back to 1967, when they were providing maintenance services on ARFF vehicles which were becoming increasingly complex and difficult for airports to support. Crash Rescue's highly skilled technicians traveled throughout North America and globally, providing parts and service support for airport firefighting equipment.

Putting this expertise and extensive knowledge of every brand of ARFF vehicles to further use, from 1978 to the present, Crash Rescue has since become the "go to" remanufacturer of all types of ARFF vehicles for airports worldwide. Remanufacturing remains an important aspect of Crash Rescue's business today. Currently the company is

hard at work remanufacturing ARFF vehicles for the Air Force, Marines, Navy, Army and several defense contractors, as part of a large government contracting initiative.

You may not be aware of this, but airports that have their vehicles remanufactured by Crash Rescue benefit by saving approximately 50% on the cost of a new fire truck. They also benefit from all the expertise gained through over 40 years of experience working on all types and brands of ARFF equipment. As an added bonus, remanufacturing now gives airports the ability to add more current, state of the art options that were not even available when the original vehicle was built. Another great benefit of remanufacturing is that users are able to minimize their impact on the environment. This ability to reduce the "carbon footprint" of an airport, without compromising the ability to meet critical operational or regulatory requirements is a large advantage of remanufacturing with Crash Rescue. The highly skilled personnel at Crash Rescue are always ready and willing to assist in establishing the proper criteria, specifications, and standards for remanufacturing any kind of complex vehicle.

New products business takes shape

In the 1990's, Crash Rescue recognized the necessity to innovate some much needed tools, which would be specifically designed to improve rapid attack and provide more targeted firefighting agent application methods. The focus at Crash

*Fire fighting Snozzle
aerials on Ziegler ARFF
vehicles, Stuttgart,
Germany*



Rescue all along has been on providing the industry with lifesaving technology that maximizes the agent application, while at the same time minimizing waste.

The original SNOZZLE was a 50 foot articulating waterway that was adaptable to any ARFF vehicle. At its beginning, the original HRET was only purchased by those visionary fire departments that saw the advantage of the low angle of attack the Snozzle provided and the benefit it gave versus the critical time constraints associated with ARFF. Being light in weight, the Snozzle had the ability to be deployed quickly, without outriggers, and to apply firefighting agents on difficult to reach areas at an aircraft accident. The flexibility and adaptability of the Snozzle helped it to become recognized as an ultimate tool, able to enhance the safety of the firefighters and passengers at an emergency scene. From that point of view, I can easily say that this is the tool that revolutionized the ARFF industry.

As more and more users all over the world wanted to utilize the Snozzle, civil aviation regulators, standard writing organizations, as well as those senior military ARFF providers, were required to validate its operation. Official tests were carried out, with special attention being paid to the low angle of attack application on

pool fires. All of these tests resulted in much faster fire control with significantly less agent. These test results provided irrefutable evidence that the Snozzle was capable of saving both lives and property.

Through the results of this critical testing and the similar methods used all over the world to fight ARFF related fires, Crash Rescue has rapidly expanded its products into the international market. The company currently has products in South America, Central America, Canada, Pacific Rim, Australia, South Africa, Asia, the Middle East, and throughout Europe. In 2010, Crash Rescue made a significant investment by deploying personnel to Europe to support its critical and ever growing European customers.

It's important to note that the continuous research efforts to improve on the Snozzle did not come easy. These improvements came at the cost of time, testing, money and were in response to real airport emergency situations. This focus and these efforts have produced some notable aerial innovations for the fire fighting industry: Ergonomically proportional joystick controls, automatic leveling of the nozzle, a fully controlled piercing nozzle able to reach down to cargo holds or up into the top of the aircraft. Unlike other products on the market, the compact nozzle assembly of the Snozzle can fully access a passenger doorway and with a high volume flow and a 360 degree pattern, cover the width of a wide body aircraft. The proportional hydraulic controls allow for a slow, precise penetration of the piercing nozzle, which enables it to reach 40 inches (or more with available extensions). The boom has the ability to reach down below grade, and the inclusion of the Hydro-Chem technology has proven to greatly improve the effectiveness of dry chemical application.



*Snozzle HRET inside
passenger doorway
works from aircraft
interior*



*Crash Rescue RHINO
turrets*

Moving forward, the Snozzle is increasingly proving to be the tool of choice for installation on municipal and industrial vehicles. With its short outriggers, versatile booms, and compact head, its maneuverability is making the municipal Snozzle the choice for urban and rural departments. The diverse needs of the municipal fire departments have been met through the boom's ability to pivot 360 degrees, pierce/vent roofs, and identify "hot spots" and see body heat signatures with FLIR camera technology. All of these functions are controlled with handheld radio remote controls, which enhance a pumper teams' flexibility at a fire scene. The municipal market is a growing segment for Crash Rescue.

Around this same time, Crash Rescue introduced the RHINO, a new line of high performance bumper turrets. Features such as: single joystick

ergonomic controls, available auto features, Hydro-Chem nozzle option that encapsulates the dry chemical, and best of all, allowing unrestricted vision for the operator. This invention allowed us to benefit from the ground level attack method of fire fighting, dramatically improving agent delivery, which has always been promoted by Crash Rescue. The RHINO is especially valuable for airports with increasing budget issues. It gives them the low attack advantage of the Snozzle without the cost.

TRI-MAX, a "cold compressed air foam system", patented by Kingsway, a partner of Crash Rescue, is another valuable technology that has been pioneered for the ARFF market. TRI-MAX technology multiplies the foam by infusing cold, compressed air, which chills the air down to near freezing, while also multiplying the foam output up to twelve times. When combined with



*An RMT with flame
detector guarding a jet
hangar*

Crash Rescue's new offices

Bernard Valois has been involved in aviation fire protection since 1974. He started as an airport fire fighter with Transport Canada, and through various promotions reached the position of Chief Emergency Response for the 110 Transport Canada owned and operated airports. In 1996, in an effort to further privatize Canadian Government Airports, Bernard joined the Civil Aviation Aerodrome Safety Branch of Transport Canada in the role of Senior Specialist Aircraft Fire Fighting.

Bernard is an active participant in the standards writing process, in addition to his involvement in the NFPA aviation safety standards. He has also chaired the International Civil Aviation Organization Rescue and Fire Fighting working group, the Canadian National Standards committee for protective clothing and fire fighters helmet, the Airport Commission of the "Comité technique international de protection contre les feux" and the NFPA 414 Standard Task Group. Bernard has served on the Canadian Association of fire Chief Board of Directors, as well as the NFPA Aviation section Board of Directors.

Crash Rescue Equipment Service, Inc., Dallas, Texas, is a manufacturer of customized small trucks and fire fighting apparatus, including the SNOZZLE, and remanufacturer of ARFF vehicles.
www.crashrescue.com/
www.SNOZZLE.com



encapsulated dry chemical agent discharge technology, a TRI-MAX system can be mounted to almost any small truck, transforming it into a vehicle that can dispense up to 1200 gallons of finished fire fighting agent. Crash Rescue continued to adapt this technology to the needs of the industry with the design and manufacture of the **Renegade**, a line of customized, small to medium sized, twin agent trucks that provide an advanced level of fire fighting capability. Another adaptation of the TRI-MAX technology is the **RMT**. The **RMT** is an unmanned hangar protector with electronic flame detection capable of "seeing" a flame at approximately 30 meters. The **RMT** is in wide use by both military and commercial users.

After visiting the company last fall and seeing some of the new processes established by the Ashton Capital Group over the last three years, I can honestly say that this new ownership has made enormous improvements. Some of these improvements include: an ISO certification project to be completed toward the end of 2010. A massive facility renovation, which has improved their image and improved production performance and after meeting many of the key people on the service and engineering team, it's apparent that the management team is committed to build on the solid reputation that the previous owners of Crash Rescue worked so hard to build in the



Crash Rescue Headquarters in Dallas, Texas

Aircraft Rescue Fire Fighting Industry (ARFF) market.

It has been my honor to work with Crash Rescue throughout my years with the Canadian government, and I am happy that this relationship continues with the new team. These dedicated people are truly leading the industry, as Crash Rescue always has, driven by a vision and focused on solid results.

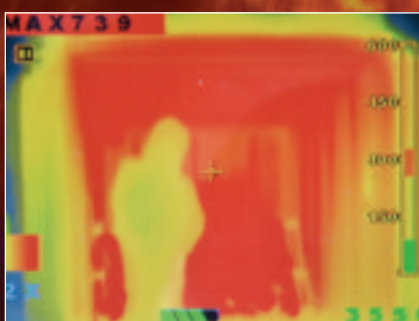
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Images provided by Crash Rescue Equipment Service, Inc., Dallas, Texas



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Firefighting Offshore

By Dave Cochran

When called to combat fires that are away from the beach, things change. You no longer have the luxury of being able to call for logistical support such as foam concentrate supplies and expect to have them delivered to you in minutes, hours or even days.

Given a situation on land, you may have the benefit of having them brought to your location fairly quickly – if you have benefit of a mutual aid group or neighboring business facilities, or even from locations a few hundred miles away, which hopefully put them within a few hours depending on traffic, and trucking availability. This has been done many times in the United States and Europe with great success.

When the call is made to bring you offshore, you must first locate a work boat, or a barge and tow boat, or other type vessel capable of becoming a suitable platform from which to operate. Hopefully at a location as near to the fire area as possible-realizing you may have to truck your equipment over a long distance just to get to the dock for loading all of your pumps, hose, foam stocks, and other miscellaneous equipment.

Remember, boats will rock and roll, and the seas will dictate how high the rock and the roll. This will require the pump(s), delivery devices, and other heavy equipment to be tied down, before you leave the dock, and preferably with heavy chains to assure it does not move and endanger not only personnel, but the boat as well. If you had assurance the seas will remain calm during travel to the scene of the fire, welding may be done during this period. If not, then all welding and tying down, must be done while tied up at the dock.

Another consideration is to where you should position your pump(s), and delivery device(s). Obviously the pumps must be located as near to the side of the boat as possible to allow for drafting hoses to be able to reach the water to assure the drafting will be uninterrupted due to move-

Pic courtesy of Dave Cochran



ment of the boat. You should consider making the length of the drafting hose long enough and capable of going deep enough so that movement of the boat will not pull the strainers out of the water – seas can be extremely high in rough weather. It is of the utmost of importance the lead firefighter consult the captain of the boat to reach a decision as to where is the best side (port or starboard or towards the stern) from which to operate. The captain has to be able to maneuver the vessel (if unable to tie up alongside a ship or platform) for the firefighting team to successfully combat the event. It pays to be on good terms because the captain is the boss of the vessel. He

Foam stocks must be positioned so that they can feed the number of delivery devices being operated, and, they must also be secured to prevent them from moving.

can (and will) pull away if he believes his vessel or crew is in any danger. Get to know the Captain well. The better the relationship, the better the cooperation you will receive.

Foam stocks must be positioned so that they can feed the number of delivery devices being operated, and, they must also be secured to prevent them from moving. Foam containers are as much a danger to personnel and the vessel if the seas cause them to move. Find some way to maintain their position on the vessel even if it means tying them together with cable or welding a pen in which to contain them. The importance of making all equipment unmovable is of the utmost importance for safety of both personnel and the vessel.

In one instance a United States Coast Guard

Cutter-actually a buoy tender was used as a platform to combat a small Lake Tanker fire on a major river in the US. It worked very well even though the size of the vessel made for some tight quarters, but still it worked. The river was calm which made for a very safe operation. Once the job was considered reasonably safe, the firefighting materials, foam, delivery devices, pumps, etc., were transferred to a barge which was moved as needed by a tug boat. This operation lasted 30 days, and because the operation required 24 hour attendance, and the stand by crew was cut back to a crew of 4 persons, the tug boat was used as quarters, serving as a home for the firefighters. During this entire operation, the U.S. Coast guard and local authorities were on site. The shores were walked every day to assure the environment was not compromised.

Later, a similar operation took place in another state, when a fire on board a large barge also carrying gasoline, occurred when a collision took place. The fire was actually extinguished by the nearby city Fire department-they did a great job-but because the salvage operations were going to take a considerable amount of time, a contract Industrial firefighting company was hired to do the standby while the fuel was off loaded to other vessels. Another barge was used to handle the logistics and to assure the firefighters had a safe platform from which to operate. The entire operation took about 30 days to complete. This location was in the lightning capitol of the United States, which at times was very uncomfortable because of the frequent lightning that took place during the off loading operations. It should be mentioned here that the United States Coast Guard was on hand monitoring the entire situation 24/7.

In the early nineties, a very large tanker carrying crude oil was anchored in the lightering area off shore Texas when a fire occurred. The fire burned for days and was handled by a number of different groups, and came very close to becoming a disaster from the stand point of crude oil being

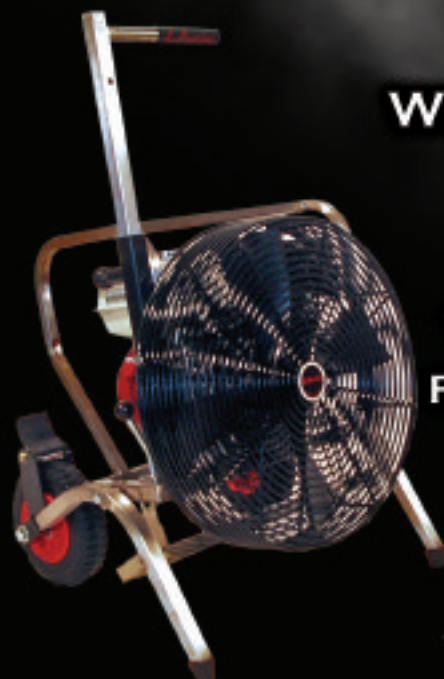
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Pic courtesy of Dave Cochran

Dave Cochran started his career with the Wilmington Manor Delaware Volunteer Fire Department in 1953. With this department he worked his way up to Assistant fire chief, holding many other officer positions during his years with the department. He is a lifetime member of this company.

In 1957 he joined Tidewater Oil Company (later Getty Oil), as a fire guard responsible for maintenance and testing of all fire equipment in the Delaware Refinery Fire Department. He became a Fire Inspector in 1958, responsible for issuing of hot work, and entry permits, and first aid, training on the off shifts. In 1971 he became Fire Chief and held this position until 1975 when he was promoted to the Southern E&P Division, as manager of Fire Safety and health. His responsibility covered 8 states, offshore operations, and the Getty operations in Kuwait.

In 1985 Dave joined national Foam Systems as a Staff Consultant, responsible for operating their annual foam training school at Texas A&M University, and was their American Petroleum Institute (API) representative. During this period he worked with several committees writing documents used around the world with safety and fire protection.

In 1989, he joined Boots & Coots Fire and Protective Inc. (later Williams Fire & Hazard Control), and was responsible for sales and as a lead firefighter. In 1995 he rejoined Boots & Coots, where he is today, and does training, safety, and other duties that might require his expertise.



spilled into the Gulf of Mexico. As it was, damage did occur to beaches and wild life for many miles along the coast line. The vessels stern was very close to being awash because of the water being used to combat the fire. **IT IS RECOMMENDED A GALLON OF WATER BE REMOVED FOR EACH GALLON OF WATER USED TO COMBAT THE FIRE.** This is very difficult to do and requires boarding of the vessel, and also involves the use of dewatering pumps. If done correctly and, taking the environment into consideration, should be dewatered into a barge(s) to be certain any oil carried by the offloading of water is placed into the barge(s) for delivery to a facility for handling all offloaded material for safe elimination probably by use of incinerators.

Once the fire was extinguished the offloading of product was completed without problem. The vessel remained anchored until the investigation was completed. This event, probably because of the relationship to Galveston, and Houston had tremendous curious vessel traffic and the air traffic was so heavy, air traffic controllers were brought out to regulate the aircraft in order to eliminate further possibility of the incident accelerating based on the amount of air traffic over the area.

The further from shore, the more complex the efforts become because of the logistics. Any additional logistics must be sailed to the location in the sea. In addition, the situation may involve a vessel(s) that are not carrying petroleum products. Today's world many vessels carry medical products or other such exotic products, automobiles, (don't forget, each automobile carry enough fuel to get them on and off the vessel, flammable gases, vessels carrying containers, etc., you name it and you may run into it.

If possible attempt to find out what the situation is before attempting to load out equipment, etc.

Container ships, because of the different cargo being shipped, create obvious hazards that are or may be different from oil tankers, medicine vessels, etc.

Crude oil vessels may well create another hazard not always known by firefighters-especially those not familiar with handling petroleum products. This is called BOILOVER. This phenomenon

is created when the light ends contained in the product burn off and create a "heat wave" or the sinking of the hot oil towards the bottom of the tank(s) located on the tanker. When this heat wave contacts the water in the bottom of the tank, it turns to steam thus ejecting the oil from the tank into the air several hundred feet. This burning hot oil must come down (gravity) and follow the wind current down onto the vessel involved and any other vessel located in the immediate area, thus endangering all personnel located on anywhere in the near vicinity of the event. Prior to a boil over occurring the vessel(s) involved with the firefighting operations and any other vessel(s) in the area should be well clear of the area up to a distance of a minimum of 1/4 mile. Needless to say the situation is magnified and personnel are in grave danger. The heat wave will progress downward 1-3 feet per hour. **DO NOT TAKE A CHANCE. IF YOUR VESSEL IS TIED ONTO THE INVOLVED VESSEL. MAKE CERTAIN YOU PULL CLEAR AND HAVE A SAFE ZONE OF 1/2 TO 3/4 A MILE.** In addition, remember boil over can occur numerous times, and can happen AFTER the fire appears, to be or actually declared out. Indication of boil over is the noise may sound like a frying pan with the liquid boiling out of it, increased smoke, and noise period. Be well clear as quickly as possible.

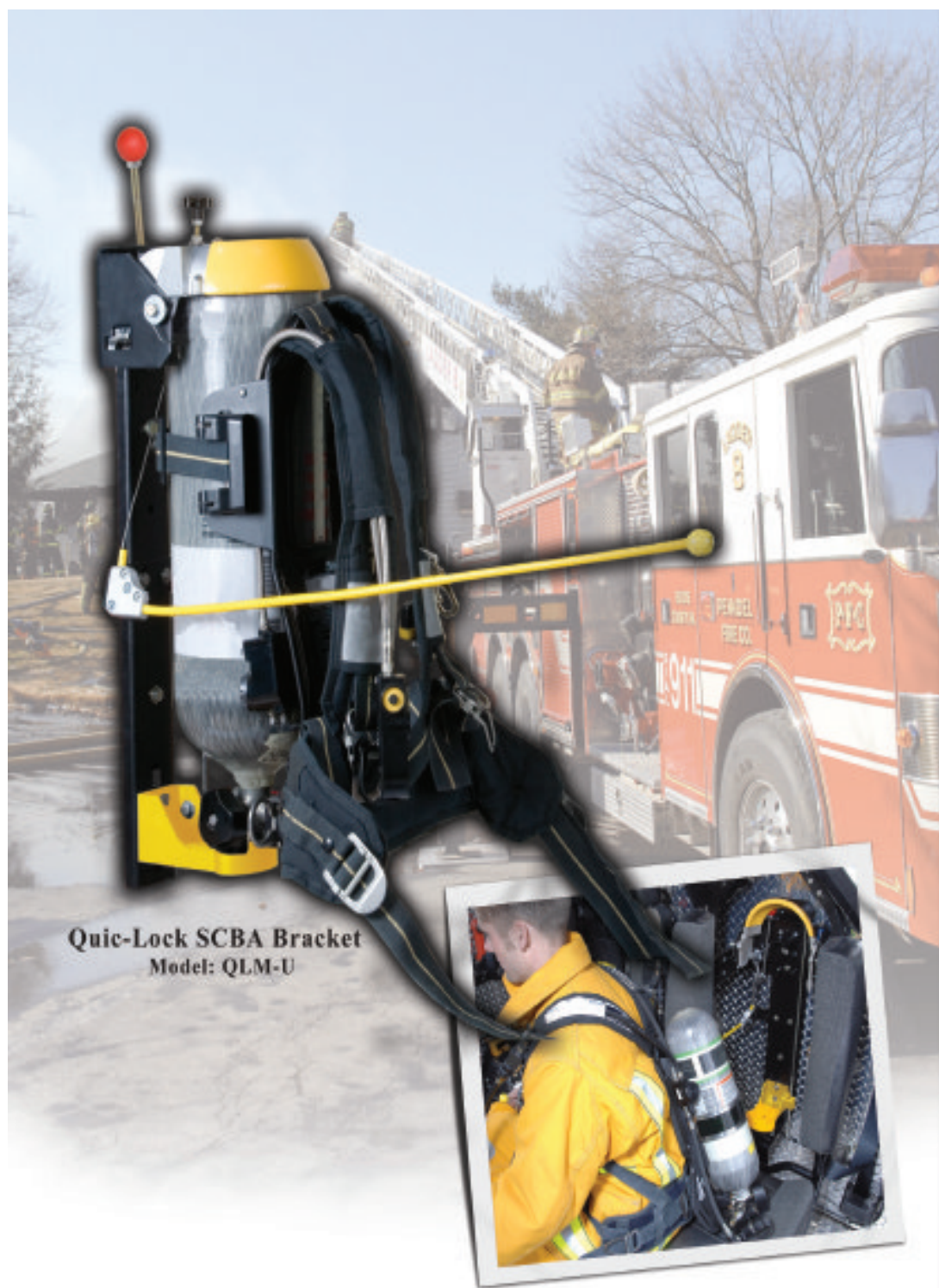
Vessels carrying super duper bad stuff frequent the seas, and it is absolutely imperative you attempt to obtain as much information as possible what you are about to become involved with. This includes ANY vessel you may be faced to combat. If at all possible find out all information prior to leaving the beach.

In closing, do not tie up to a vessel unless you have full certainty you are safe to do so. Do not put people onto a vessel for the same reason. The exception might be if nothing is involved but the quarters area, when boarding is the best way to make close combat. With the firefighting equipment available today, the reach of the stream(s) can obtain distances up to 300 to 400 feet, so the firefighting vessel can maintain a safe distance until control is established and it is safe to move in to the vessel involved. Safety is paramount no matter where a team is called to do combat. **IFF**

TRAINING



Pic courtesy of Texas Engineering Extension Service



Quic-Lock SCBA Bracket
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INTERSCHUTZ

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INTERNATIONALE LEITMESSE FÜR RETTUNG,
BRAND-/KATASTROPHENSCHUTZ UND SICHERHEIT

INTERNATIONAL EXHIBITION FOR RESCUE, FIRE
PREVENTION, DISASTER RELIEF, SAFETY, SECURITY

LEIPZIG 7 - 12 JUNE 2010



Interschutz, the world's largest trade exhibition aimed at the fire industry will soon be upon us. Held once every 5 years, anyone and anybody involved in the fire safety and fire fighting industry will be in Leipzig, Germany between the 7th and 12th June 2010 attending this prestigious event. IFF takes a look at some essential information for visitors as well as exhibitors attending Interschutz.

VISITOR INFORMATION

INTERSCHUTZ 2010, 7 to 12 June

At a glance

Duration:

Monday, 7 June to Saturday, 12 June 2010

Opening hours:

Daily from 9.00 a.m. to 6.00 p.m.

Admission prices:

Advance sales and Ticket office

Single admission	18.00 EUR
Full-event ticket	41.00 EUR

Student's day ticket (incl. young people
in military or civilian service: ID required)
11.00 EUR

Tickets can be bought in advance via the Internet
(www.interschutz.de)

Free ride to and from event

Your admission ticket entitles you to ride public transit free of charge* on the day of the event on all lines operated by the MDV transit authority (Mitteldeutscher Verkehrsverbund), valid for the following regions and fare zones:

MDV fare zones

*The visitor's free ride to and from the exhibition center via MDV-operated public transit lines on the



day of the event is valid for the following regions and fare zones:

Leipzig
Leipzig County
Nordsachsen County
Mittelsachsen County
Burgen County
Halle
Saale County
Altenburger Land

Catalogue:

€17 plus postage and packaging (available approx. 3 weeks before opening day of event)
Internet: <http://www.interschutz.de/catalogue>

Visitor information:

Internet: <http://www.interschutz/visitorservice>
Email: interschutz@messe.de

Getting there:

If traveling by car, simply follow the signs to the exhibition center (*Messegelände*) in and around Leipzig; the Leipzig exhibition center is well sign-posted. Our dynamic parking guidance system will point you to the nearest parking space.

If traveling to Leipzig by train, you can reach the exhibition center (*Messegelände*) from Leipzig Central Railway Station (*Hauptbahnhof*) by taking the regional train, the FlughafenExpress train, the tram or a taxi. For more information, please inquire at the Service Point desk at Central Railway Station.

Numerous airlines serve the Leipzig/Halle Airport. There are over 300 direct flights to and from eight German cities and 72 cities abroad. Leipzig/Halle Airport also gives you easy access to the following major international airport hubs: Frankfurt, Munich, Paris and Vienna.

Travel and accommodations:

Do you prefer a quiet's night sleep, or would you rather be close to Leipzig's pulsating nightlife? The Leipziger Messe company can provide you with recommendations and reservations for any location or price category. Your selection of accommodations ranges from hotels, pensions and guesthouses with a total of 12,000 beds between them – from "shoestring budget" to luxury. For more information, visit www.interschutz.de/61050.

Parking:

The press parking lot for journalists at Leipziger Messe is located inside the exhibition grounds next to the Messehaus building. The parking lot is accessible via Messe-Allee, South 1 gate.

Range of exhibits:

Vehicles and vehicle equipment, fire extinguishing appliances and systems, fire extinguishing agents, technical support and environmental protection, rescue, emergency, first-aid and medical equipment, personal protective equipment, measuring and detection apparatus, control-station and signaling technology, information and organization, equipment for fire stations and workshops, building and construction industry, structural and organizational fire protection, associations, organizations, service companies, technical literature, model making, fan articles, gifts,

Exhibitors:

The organizers anticipate some 1,100 exhibiting enterprises, occupying more than 80,000 m² of net display space.

Press Center:

At the Messehaus building, open from Sunday, 5 June 2009, starting at 9:00 a.m.

Bronto Skylift - Rescue Vehicles



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LEIPZIG 7 - 12 JUNE 2010

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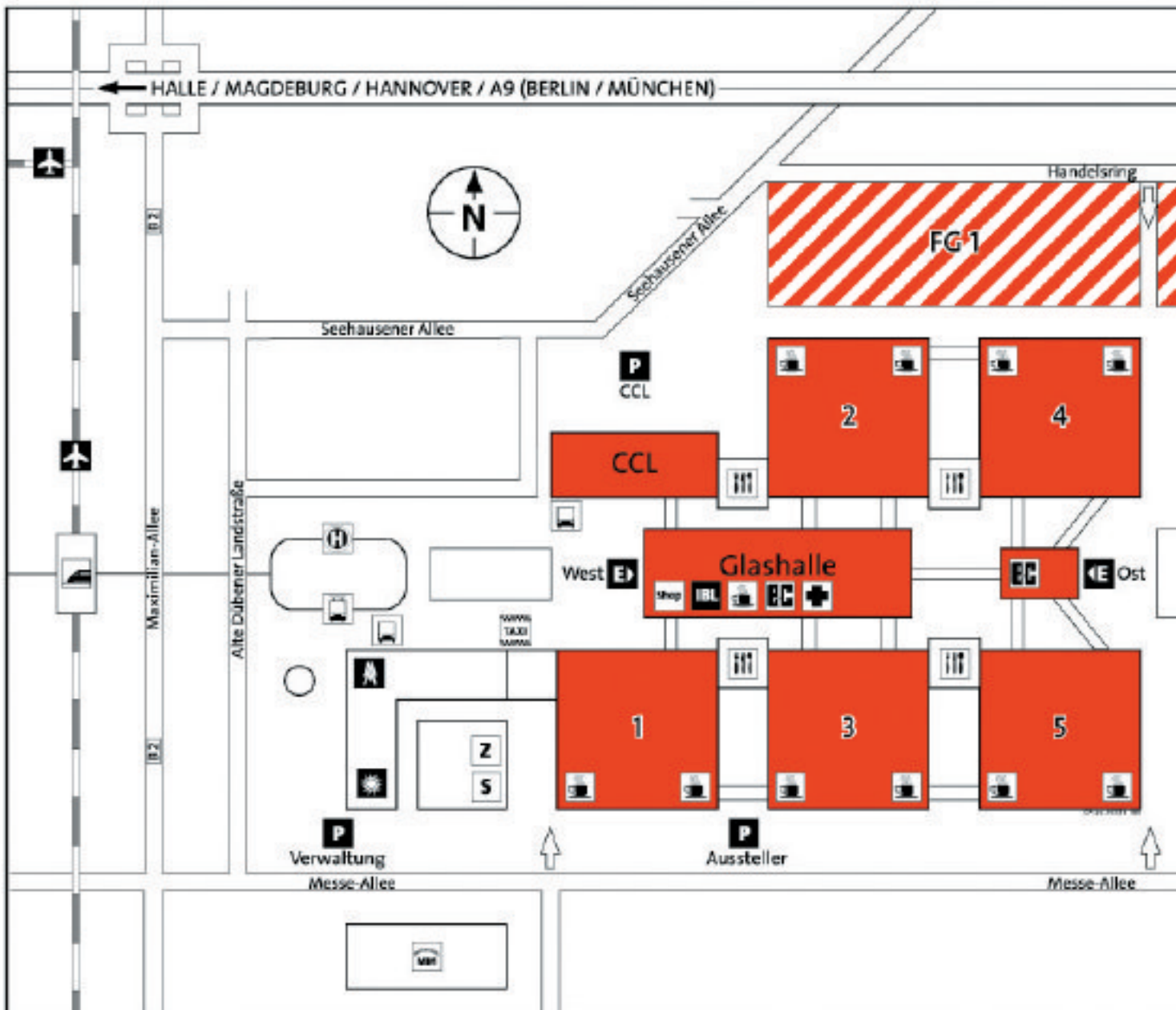
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Above all



Display Categories INTERSCHUTZ 2010

Vehicles and vehicle equipment

Hall 1, 2, 4 + Open-air ground 1

Fire extinguishers appliances and systems, extinguishing agents

Hall 1, 5

Technical support and environmental protection

Hall 1, 2 + Open-air ground 1

Rescue, emergency, first-aid and medical equipment

Hall 1, 2, 3 + Open-air ground 1

Personal protective equipment

Hall 1 and 3

Measuring and detection apparatus

Hall 3

Control station and signaling technology

Hall 3

Information and organization technology

Hall 3

Equipment for fire stations and workshops

Hall 1, 5

Building and construction industry, structural and organisational fire protection

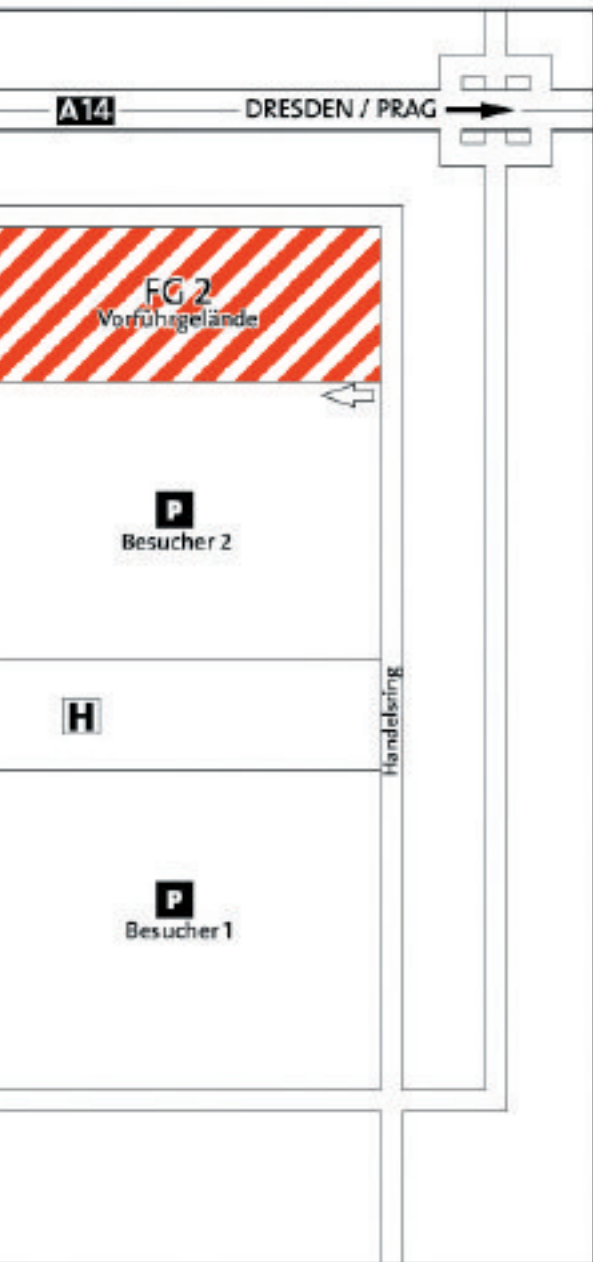
Hall 1, 5

Associations, organizations, services

Hall 1, 2, 3, 5

Trade literature, model making, gift items

Hall 1, 2, 4



The benefits of exhibiting at the show

The No.1 event in the industry calendar

With more than 120,000 visitors and over 1,200 exhibitors, INTERSCHUTZ is the leading international trade fair for public safety. Featuring the world's largest array of exhibits for disaster prevention, rescue and emergency services, INTERSCHUTZ offers you a fantastic opportunity to demonstrate the competence of your company and organization to the entire industry – with just one trade fair presentation.

Unique concept

Due to the combination of commercial and non-commercial exhibitors under the same roof you benefit as a supplier from direct feedback from the users of your security solutions. This puts you in an excellent position to fine-tune your product range to meet changing market needs.

Press Centre Entrance	Station Leipzig Messe
EC-Cash dispensing machine	Heliport
Business Lounge	First aid
Restaurant	Fair shop
Parking	Café
Airport-City-Shuffle	Police
Taxi	Customs
Tram line 16	Forwarding Agencies
Tram	MaxicoM
Bus Stop	(Euro-Asia Business Group)

Efficient business platform

With over 90% of visitors classed as trade visitors, you can be certain of reaching large numbers of decision-makers and buyers. This makes INTERSCHUTZ an ideal platform for successful new product launches and business deals.

International audience

At INTERSCHUTZ you'll meet top decision-makers from all over the world. This gives you ready access to profitable new markets.

Barometer of trends

Learn about pioneering innovations and key trends within the industry at the conferences, symposia and corporate lectures that accompany the show. You'll benefit from the professional expertise of leading experts and gather useful information for shaping the future course of your company and organization.

Attention guaranteed

An extensive advertising campaign and an attractive program of events serve to generate and maintain the interest of visitors and the media.

Excellent facilities

The modern exhibition complex in Leipzig with its fascinating steel and glass architecture provides you with everything you need in terms of both organization and technical facilities.

Reasonably priced entry

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The Fire Service College
Moreton-in-Marsh England

A world force in fire service development

By John Lowe

Head of International
Sales

If someone were to mention to you there is a College dedicated to worldwide fire service development, that has a 35-year pedigree, has trained over 340,000 fire personnel globally to date, is set in a 550 acre site and almost certainly offers the most extensive range of fire training and consulting products available – who would you say it was? You’ve probably guessed already – The Fire Service College.

Over its history the College, based at Moreton-in-Marsh, Gloucestershire in the UK, has been at the forefront of innovation – whether it is in specialist operations, specialist rescue, the latest thinking on fire engineering and safety, or the continual updating of its rigs and courses designed to develop operational command techniques and bring about the effective management of incidents at all levels. Today, the College even works as a consultant, advising clients on how to improve the performance of their fire service or fire operation.

Whether you work in one of the many fire services spread across the globe, hold fire responsibilities in business and industry (petrochemical, hazardous goods, manufacturing etc), or have an emergency management or fire safety role, the College can design bespoke programmes to develop

you and your organisation. It can even bring its expertise to you, outside the UK, in the form of outreach programmes, covering all areas of its operation. The College sums up its credentials simply – Unrivalled Experience, Unequalled Expertise.

Tony Barnett, Director of Business Development, Sales & Marketing at the College, gives his view on what sets us apart: “The College has the unique ability to advise on most, if not all aspects of the fire environment and the effective operation of fire organisations. In addition to providing cutting-edge training, the College can also benchmark organisations against internationally-recognised standards, design and recommend strategic improvement plans and even manage the implementation of the resultant change programmes. We are an organisation geared to driving operational improvement for all our clients.”

The College's realistic oil rig simulator



Unparalleled resources

Just imagine a day-to-day incident that needs sound theory and plenty of practice to get your response right each and every time. Or imagine the unthinkable, that might never happen but could, a major incident where it is essential to scope out incident plans, train people in their implementation, and practise to get it right.

Imagine what could be achieved if you had all of this at your disposal:

- Simulation Suites
- Incident Command Complex
- M96 Motorway Training Area
- Oil Rig Simulator

- Large Tank Simulator
- Aircraft Simulators
- High Rise Simulator
- Helicopter Simulators
- Indoor Training Rigs
- Breathing Apparatus Training Complex
- Rail Accident Complex
- Industrial Factory Training Complex
- Shopping Complex
- Road Traffic Collision Complex
- Fire Behaviour
- Ship and Marine Training Area
- Fire Investigation
- Urban Search & Rescue Training Complex

These resources, accompanied by the College's knowledge of best operating practice and its virtual reality simulator, can be combined to design a programme specific to each client and their own individual requirements.

John Lowe, Head of International & Wider Markets says: "We can replicate almost anything. Our scenarios are very realistic, yet there's a high degree of safety and control. We have about six buildings that we can set fire to and a couple we can smoke up. There are aircraft that we can set up for various kinds of fire and rescue simulations, as well as an oil rig and a ship, which is made out of concrete so we're never going to sink it! We have a motorway here, which we can set up with cars and lorries, a railway track and level crossing, a roundabout, plus perimeter and access roads that we also use for training."

Unequaled expertise

To match the extent of the College's practical resources, it also provides a wealth of expertise and knowledge, with a tutor base that has an insight into the practical application of both general and essential concepts down to individual specialised areas.

Take, for example, fire engineering and fire



Tackling a flange fire at the Fire Service College's incident ground



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valve isolation training
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safety where specialisms are covered in great depth, including fire investigation, industrial and domestic fire protection systems, high rise building risks, building regulations and even smoke control. These as well as the more general foundations of fire safety, fire risk assessment and fire legislation, are blended together for each client. So whether it is a requirement for training in Malaysia, Hong Kong, Thailand or Taiwan for experienced or inexperienced practitioners, with general or specific needs, a programme is tailored to meet all these requirements.

The practical emphasis of the College's approach to learning and development comes with its aim to ensure that the training provided can be immediately applied once back in the workplace. This is because it is delivered by leading professionals drawn from fire and rescue services throughout the UK, and guarantees training is as up-to-date as it is hands-on, applying equally to all subject areas on offer:

- Incident Command and Management
- Rescue
- Urban Search and Rescue (USAR)
- Multi-agency Training
- Hazardous Materials
- Industrial Firefighting
- Aircraft Rescue and Firefighting
- Marine Firefighting
- Off-shore Firefighting
- Fire Safety and Engineering
- Firefighter Development Training
- Instructor Courses
- Specialty Courses and Customised Training Programmes

Responding to new threats

Since the events of September 11th 2001, fire services, civil defence forces and fire organisations across the world are having to re-examine the

traditional ways of doing things to see how they match up to the new demands placed on them by a changing world. Often this requires reviewing how effective they are at command and control, operational mobilisation and resource management, together with their operations that prevent fire and support core activities (procurement, finance and IT etc). This is a complex and time consuming task, which is the reason why the College has recently been asked to undertake this type of study for several clients.

Global reach

A significant proportion of the College's activity is taken directly to the client throughout the UK and overseas with the outreach programme. The Fire Service College visits clients on their own sites, using the equipment they use every day, working in their local environment. Exercises, case studies and simulations can be tailored to specific practices, with each programme designed uniquely to the client's organisation.

The popularity of this form of training delivery has resulted in the College building an international customer base that spans the Middle East, Europe North Africa, South East Asia and the Caribbean. Equally there is still a demand for international customers to visit Moreton-in-Marsh and take advantage of its unique facilities, learning alongside the College's UK delegates.

Regardless of whether training is delivered via outreach or through clients coming to the College, we are keen to keep in touch offering ongoing help and support. Training and consultancy is a two-way street – whether it's a new development, a fresh insight or an operational improvement, we are keen to promote the sharing of best practice and the continuous raising of standards for the College and its clients.

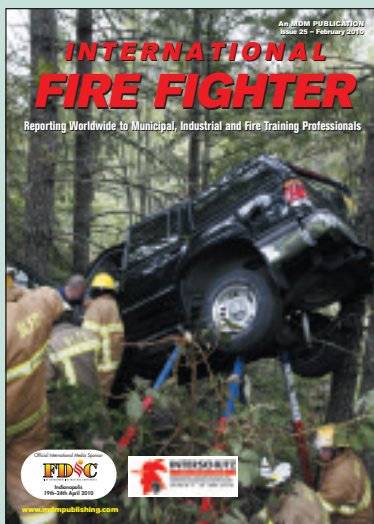
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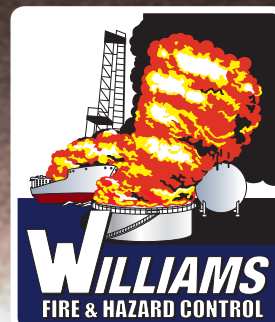
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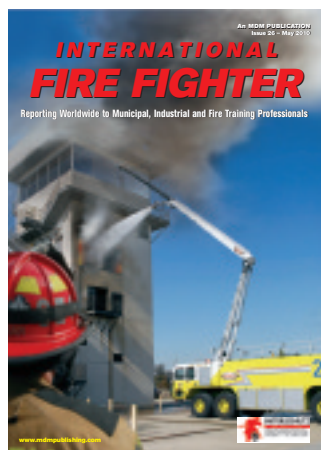


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David Staddon & Mark Seton

Sales and Editorial Manager

Mark Bathard

Contributing Editors

Mark van der Feyst, Ted H. Schaefer, Bogdan Z. Dlugogorski, Eric M. Kennedy, Mark Bathard, Charlotte Brandt, Austin Simmons

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Collins to join MDM Publishing Ltd as Group Editor



Well known industry figure Graham Collins will join MDM Publishing Ltd as Group Editor, starting in June 2010. He will take direct responsibility for all editorial matters involving MDM's three leading trade magazines, International Fire Protection, International Fire Fighter and Asia Pacific Fire. When asked to comment on the appointment Collins said "I am thrilled to be joining such an exciting and dynamic organisation as the Group Editor. MDM Publishing Ltd has established its titles as the leading business to business international journals available to fire professionals around the world. I am looking forward to shaping new editorial features and exciting new content in the coming months within all three journals".

Graham has worked and lived in the USA, Middle East, France, Germany and Japan and brings over 15 years experience in the international fire industry, particularly fire suppression, foam concentrates and hardware, detection and alarm systems and emergency response. He has been a regular contributor in fire safety and construction industry magazines including the MDM Publishing Ltd titles. He has also worked as a specialist campaigns director for a fire industry PR company for the past 20 years. Graham is married and lists photography as one of his major interests.



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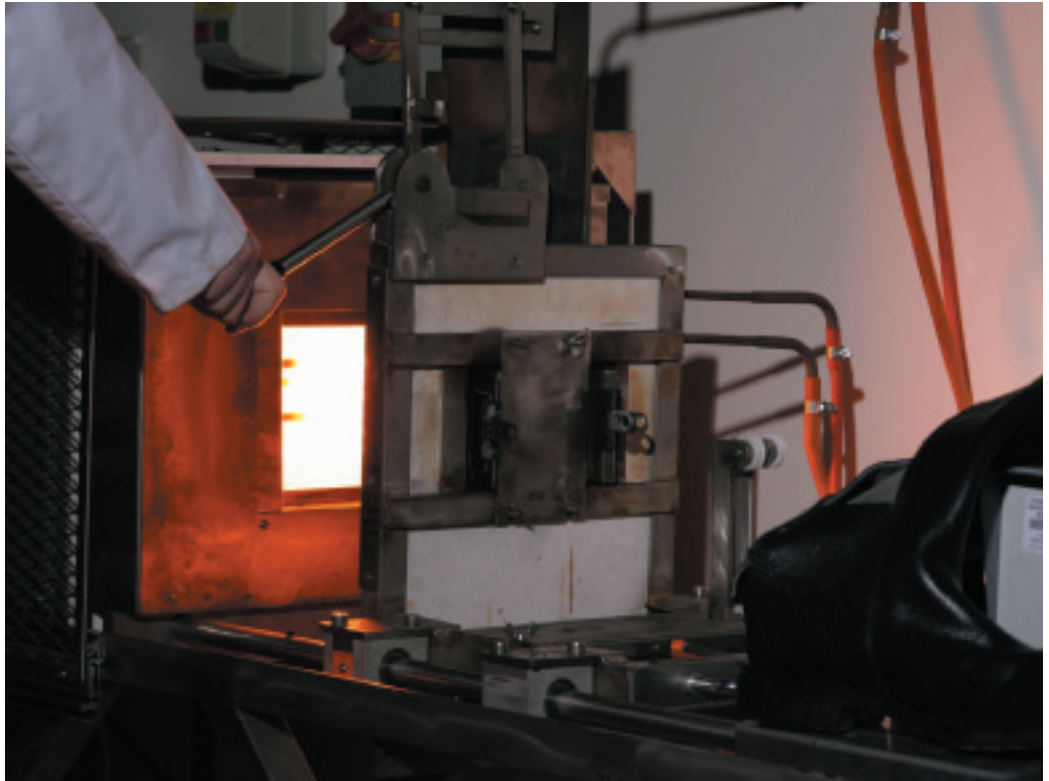
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Ensuring compliance of CE-marked products

By Austin Simmons

SATRA Technology Centre

SATRA can assist with CE compliance for personal protective equipment (PPE) and ongoing compliance throughout the supply chain.

A key consideration for all types of personal protective equipment (PPE) is to ensure that the product has been appropriately CE marked, as this is a mandatory requirement for PPE products entering the European market.

Naturally, companies involved in the supply of PPE into Europe need to ensure that their products comply with the requirements of the PPE Directive before they can apply the CE mark. This not only covers evaluation of initial examples, but also bulk production.

The CE mark enables free movement of goods throughout the EU and, therefore, is an important element of trade. In fact, most buyers of intermediate or complex PPE will not consider purchasing without seeing a copy of the EC type examination certificate issued by a Notified Body to show that initial samples are compliant. SATRA

recommends that potential customers always verify these EC type examination certificates with the issuing Notified Body, because there are a number of forgeries in the market.

Not all types of PPE need to be submitted to a Notified Body. Directive (89/686/EEC) divides PPE into three categories, depending on the level of risk that the item of PPE is claimed to protect against. Each category requires a different level of involvement by a Notified Body.

'Simple' category PPE (products designed to only protect against low level hazards with effects that are gradual and can be safely identified by the user in good time), can be 'self certified', and the services of a Notified Body are not required. Where possible, however, it is recommended that some testing is carried out by an independent test centre to provide documentary evidence which



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can be used to support any claims made about the product within the scope of Directive (89/686/EEC). Examples of simple PPE include washing-up gloves and sunglasses.

Manufacturers are obliged to produce a 'technical file' – documentation relating to the product and covering areas such as markings, instructions for use, warnings and design criteria, as well as confirming any performance claims made. Even at this level, buyers should ask for some confirmation that products satisfy the PPE Directive (which 'simple' items must do).

'Intermediate' category PPE is claimed to provide protection against risks of severe injury. The design of the prototype and associated documentation of this type of PPE must be certified by a Notified Body.

'Intermediate' category PPE is claimed to provide protection against risks of severe injury. The design of the prototype and associated documentation of this type of PPE must be certified by a Notified Body. This is the end of the Notified Body's official remit, but SATRA would recommend purchasers to require some form of ongoing production assessment. Examples of intermediate products include sports protection, mechanical risk gloves and chainsaw-protective products.

'Complex' category PPE is an item claimed to provide protection against risks of mortal danger, or dangers that may seriously and irreversibly harm the user's health. The design of the prototype and associated documentation of such items of PPE must be certified by a Notified Body. In addition, the Notified Body must also be involved with assessment of subsequent production, either by product testing or assessment of the manufacturing quality system. However, purchasers may wish the Notified Body to carry out additional verification on their own specific batches. Examples of complex category PPE include chemical protection and fall protection harnesses/equipment.

It is difficult for European-sourcing PPE suppliers to fully control the supply chain. It is also simply not practical for many smaller organisations to confirm by themselves that every aspect of the products they are importing is satisfactory, as they lack both the infrastructure and the expertise. So, how can European suppliers (often not the manufacturer, and frequently not even the importer) satisfy themselves that everything is in order? In addition, how do the EC type examination certificate holders – whether they are manufacturers in their own right or resourcers, wholesalers and distributors – demonstrate compliance?

The answers to these questions depend on a number of factors, including the company's position in the supply chain, and whether or not it is the EC type examination certificate holder.

To start with, most types of footwear PPE need to be assessed initially by a Notified Body such as

SATRA, and an EC type examination certificate issued before the CE mark can be applied. Frequently, the manufacturer arranges this, but many resourcers, wholesalers and distributors also initiate the process to ensure they control the CE mark. In some cases, a certificate is supplemented or extended to include the details of the European supplier.

The EC type examination certificate holder then affixes the CE mark to the product and produces a 'declaration of conformity' – a document that includes details of the company, information on the product, a list of the European Directives and the standards the product complies with, as well as a legally-binding signature on behalf of the organisation. The onus is on the certificate holder to ensure that all supplied product is consistent with the type-approved model and continues to meet all the essential requirements of the PPE Directive.

What will the certification prove?

Many potential customers concentrate on obtaining copies of the EC type examination certificate, believing that it will also demonstrate the bulk production will be compliant. In fact, the EC type examination certificate merely confirms that the manufacturer has the capability to make the product correctly and can apply the CE mark to bulk production, providing it remains the same as the original type approval samples. It does nothing to confirm the actual production, and purchasers should insist on being provided with an up-to-date test report on their actual batch.

It is relatively simple to document and demonstrate bulk product compliance through quality assurance systems, testing and inspection programmes if the EC type examination certificate holder is the manufacturer with full control over the production. Whilst this can be done internally, use of a reputable third party like SATRA can provide independent confirmation to provide increased credibility.

It is relatively simple to document and demonstrate bulk product compliance through quality assurance systems, testing and inspection programmes if the EC type examination certificate holder is the manufacturer with full control over the production.

Regardless of whether a resourcer, wholesaler or distributor holds the main EC type examination certificate, or has a supplementary or extension certificate from the manufacturer, it is more difficult to demonstrate the 'declaration of conformity'. Sometimes the manufacturer will allow tests and audit facilities to be witnessed, and SATRA offers to do this on members' behalf (thus saving on potential staff costs and time). Where it is not



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possible to visit factories, SATRA recommends testing a representative sample against the product specification. Using some form of sampling programme based on mathematical probability can help determine the amount of inspection and test required – for example, ISO 2859-1 (known generally as BS 6001-1 in the UK).

Inspection of products is a key quality control process for many manufacturing organisations. Even those with quality management systems such as ISO 9001 often have some form of raw material, in process or final inspection. For some companies without a formal quality management system, inspection and test may be the only means of confirming product 'quality', and is often a contractual obligation.

A typical quality assurance system will incorporate an independent quality function within the organisation, have documented procedures, and established goods inwards control coupled with in-process testing, inspection and a final product check. This does not need to be a full ISO 9001 system, but many organisations recognise the benefit of using a recognised certification body to accredit the system and issue a formal ISO 9001 certificate.

As a minimum, SATRA would recommend auditing of the manufacturer's production facilities to ensure that product is being made in accordance with the technical file. Particular care should be taken to make sure all component and raw material purchases are from the companies listed in the master materials file, and that key safety critical features (for instance, toe cap impact and compression/midsole penetration insert resistance) are batch tested. These records should then tie in with shipment details to provide a direct link to the imported goods.

The best way to minimise defects is to work with manufacturers who believe in building good quality into the product in the first place. While good contractual arrangements and working with reputable manufacturers can help, it is often prudent for resourcers, wholesalers and distributors to insist on becoming involved with aspects of quality assurance, inspection and testing of products.

Readers interested in finding out more about how SATRA can work with them to ensure compliance of CE-marked products are invited to contact safety.products@satra.co.uk or visit the website www.satra.co.uk/cecompliance

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Speedings equipment being used by the Northumberland team at the World RTC trials in Frankfurt. Picture courtesy Speedings Ltd



Northumberland Fire & Rescue Service (NFRS) RTC Extrication Team and Speedings Ltd

Northumberland have a history of success in the UKRO extrication competitions, in the early 1990's their first RTC extrication team led by the now Assistant Chief Officer Paul Hedley and backed with the full support of Chief Fire Officer Jeff Ord won the UK Extrication Championship and went on to represent the UK in the World Extrication Championships held in Florida USA.

This first team disbanded not long after their success in representing the UK at the World Championships and for several years Northumberland did not have a RTC extrication team. It was not until 2006 that Andy Pogson was asked to put together a new team. The team today has remained the same since then and has come along way from their first outing to Brighton at the 2006 UKRO championship where they finished 23rd. Andy said "the first two years competing were really tough for the team, competition extrications are very different from the RTC's we deal with operationally in the real world, we had to learn the hard way the intricate rules of the competition scenarios."

The team improved steadily through 2008 finishing 6th in the UKRO championships at Stirling. This gave them the confidence and drive they needed going into the 2009 extrication season, at Birkinshaw West Yorkshire against tough competition they finished a close 2nd to an experienced West Midlands team who piped them again a few weeks later at the Durham regional. Undeterred and equipped with some of Speedings latest innovations they went to the 2009 UKRO Championship in Glasgow knowing they had a real chance. A solid performance on the first day took them through to the final challenges on day two where everything came together and after a

PROFILE

*The Northumberland Fire & Rescue Service
RTC Extrication Team.
Picture courtesy
Speedings Ltd*



tense wait for the judges to announce the result they got the top prize from the South Wales team and Northumberland Fire & Rescue Service were again the UKRO Extrication Champions.

2009 didn't end there as the 6th place finish at Stirling in 2008 had qualified them for a trip to the Worlds in Frankfurt Germany where they got a taste of what laid in store for them at this year's World Extrication Championships in Cork, the tool operators might have a little bit more work to do but the team medics James Kidman and Donna Hay certainly don't. They topped an already very

successful year of several best medic prizes by winning the World Trauma Medic title with an excellent performance in Frankfurt.

The team profile

Andy Pogson – Team Leader – OIC

Richie Fairbairn – Tool 1

Steve Wickham – Tool 2

Steve Wight – 2nd Medic/Tool Operator

Gary Hall – Tool Operator/6th man

James Kidman – Medic

Donna Hay – Medic



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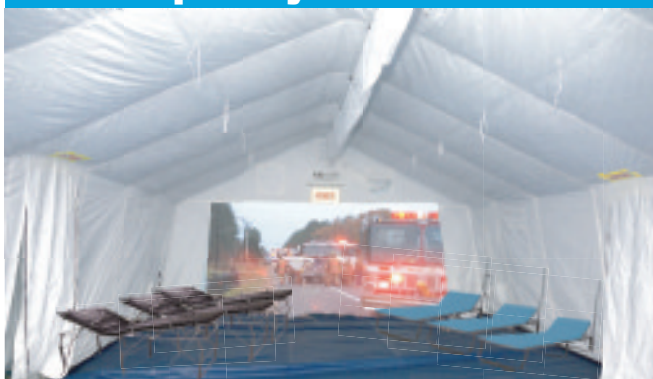
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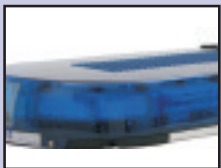


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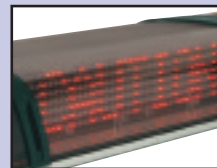
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Speedings Ltd, A Company Profile

Speedings Ltd was established in 1827 on the banks of the River Wear in Sunderland, Tyne and Wear, which makes the company the oldest manufacturing business in the City of Sunderland – a fact of which we are immensely proud.

We began by manufacturing sails and flags for local shipyards, and currently we are quite a diverse manufacturing company, from products for the emergency services to banners and signs for local businesses.

We are extremely proud to say that we have designed and manufactured safety products for every Fire and Rescue Service in Great Britain and Ireland, including Airport Fire Services.

As a family owned and managed company we pride ourselves on personal attention, quality products, reliability and customer service – these principals being the cornerstones to Speedings longevity and continued growth. We are continually reviewing and improving our quality control system which has seen us introduce an ISO 9001: 2000 Quality Management System by Global Certification, our third party assessors.

Speedings ability to manufacture products in both large and small quantities has been of huge benefit to our customers and has seen a continued and sustained growth in our 'Consultancy and Design' service. This bespoke process allows us to take a customer's initial thoughts and ideas and convert them into a detailed product design. The transition from design to production is seamless as we manufacture from our factory in Sunderland – enabling our Product Design Team to oversee the complete process thus ensuring the customer gets exactly what they asked for.

Speedings currently employ thirty five people which include twenty specialist 'traditional' sewing machinists. We do not operate a 'conveyor belt production line' and our machinists are not on 'piece work' – our production process sees our sewing machinists making a product from start to finish – this system of manufacture creates a more rewarding sense of achievement for the machinist. It is certainly an advantage once you start to consider the quality aspect, as items can be directly related to a single person.

Regular consultation with Fire and Rescue Services, in the UK, Europe, America and Australia has ensured that Speedings remain at the forefront of the design and manufacture of innovative safety systems for use in the Emergency Services and Industry. Our membership of FIRESA (the Fire and Rescue Suppliers Association) ensures we are continually kept up to date on developments in the industry (Firebuy, ICP etc).

Speedings Ltd has been developing safety solutions for UK based Fire & Rescue Services for more than 25 years. Rob Hammel, managing director at Speedings says, "we are proud to work with and support the RTC extrication teams competing in UKRO events. Many of our products were developed directly from requests made to us from RTC teams". One of the first products developed from a direct request by local teams in the North East of England was our range of sharp end protection. Speedings Ltd range of Kevlar sharp end protection is now widely accepted as the industry standard and is a good example of where techniques developed for RTC competition extrications have been adopted at every day operational incidents making the accident scene safer for both the casualties and rescuers alike.

Many UK fire and rescue services use their RTC extrication teams as proving grounds for new equipment and rescue techniques before committing them to front line services and Speedings Ltd is pleased to be part of this process. Some of the equipment we provide the RTC extrication teams with such as the specialist tool belts and door bags might only ever be used in competitions but the majority of safety systems developed with the teams finds its way into the hands of opera-

tional crews at real life incidents. Examples of equipment and safety system solutions developed by Speedings Ltd which are being used widely throughout the British rescue services include, steering wheel Airbag protection systems, Casualty soft protection sheet, Magnetic warning signs, Plastic & glass management tools, Casualty handling slings and sheets, Sharps protection and of course our extensive range of Specialist high visibility clothing. Speedings Ltd remains committed to assisting RTC extrication teams in developing new safety system solutions for use by front line services and is proud to have sponsored the 2009 UKRO champions Northumberland Fire & Rescue Service with our equipment. **IFF**



Speedings equipment being used by the Northumberland team at the World RTC trials in Frankfurt. Picture courtesy Speedings Ltd

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By Mark van
der Feyst

Confined Space Rescue:

Emotion vs. Reason

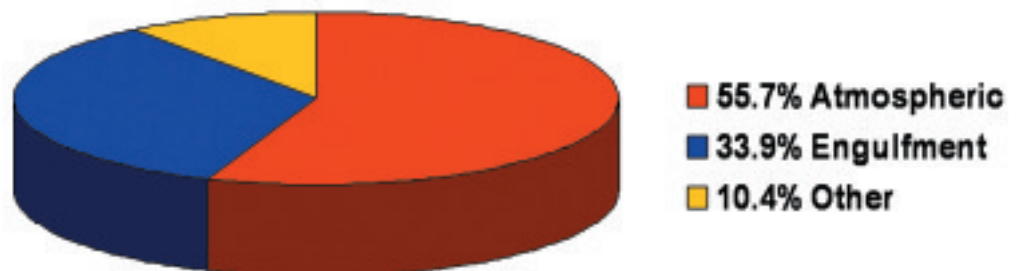
Confined space entry is a common occurrence in the workplace and everyday many employees find themselves working inside of them.

There are many dangers associated with entering a confined space. These dangers are sometimes well known to the entrant and the attendants and sometimes they are not. With an increase in regulation surrounding confined spaces, we are now in an era where the dangers are required to be known prior to any entry. Yet we still find some workers or would be rescuers entering confined spaces without knowing the hazards. In August 2000, we saw an example of this in Drayton, Ontario. This was on a farm in Wellington County involving a manure spreader. A repair needed to be made on the inside of the spreader. One worker entered the spreader to fix the problem. The worker was quickly overcome by the hydrogen sulfide that was present inside. Two other co-workers entered to affect a quick rescue and immediately collapsed. A third rescuer entered the spreader and tried to rescue the last victim, but was unable to. He was able to exit the spreader just in time. Two of the rescuers died and the third rescuer was seriously injured. The first victim was just inside the opening of the spreader and it was just a matter of reaching in a grabbing him. One of the dangers that were present that day was hydrogen sulfide gas. This danger was unknown to the worker and to the rescuers. We have seen this phenomenon happen time and time again. But why does this happen?

First let us examine why we enter confined spaces in the first place. There are many different types of confined spaces that we enter into. There are manholes, tanks, digesters, pits, silos, tankers, pipes, tunnels, vaults and wells. These are the more common spaces that we find ourselves entering into. The number one space that we

enter into is the tank. Tanks are a common space in most industrial occupancies. They are used to store materials, used as a holding tank or used to collect process waste or byproducts. So why do we go in? The answer is maintenance. We enter into confined spaces on a regular basis for maintenance more than any other reason. Inside these spaces we find mechanical devices that are used as part of the overall operation. These mechanical devices need to be maintained. The tank itself needs to be maintained. There are numerous reasons why we need to maintain our confined spaces. So we enter to maintain our confined spaces.

One survey shows the second main reason why we enter into a confined space is for rescue. We are entering into a confined space for rescue just as much as we are for maintenance reasons. This is a sad but true reality. According to statistics, 60% of confined space fatalities are rescuers (would be). About 90% of confined space entry rescue operations are recoveries and less than 2% of confined space fatalities are due to physical trauma. That means that the majority of confined space entry fatalities are due to other unknown hazards. More than 55% of all fatalities were due to a hazardous atmosphere. About 25% of confined spaces were toxic before entering. There were no monitors or ventilation for nearly half of the deaths. In all incidents involving fatalities, 25% had two victims, 11% had three or more victims. One third of all deaths were supervisors. These facts highlight a serious problem with confined space entry. In figure 1.1, we see the number one cause of confined space fatalities. It is due to atmospheric hazards. Atmospheric hazards for the



CAUSE OF DEATH BY HAZARD

SOURCE NIOSH – 1989-1999 – Sample Size 670



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most part are not visible to the naked eye. We cannot detect them with our sight. Many think that they can use their sense of smell to detect an atmospheric hazard. The problem is that when we are able to smell the hazard, it is already too late. Of the common atmospheric hazards that are found in confined spaces, hydrogen sulfide tops the list. In figure 1.2, we see the percentage that hydrogen sulfide accounts for in fatalities.

So why do we attempt rescue when we are faced with these numbers? It is due to our emotions. Our emotional response dictates our actions and unfortunately it can often lead to serious injury or death. It is important to keep our emotions in check and use reason to dictate our actions. This is tough to do. When we are faced with a co-worker or a person that we know, we instinctively want to help. It is in our nature to help those that need helping. This is why when we go to help a person in a confined space, we become the victim. We see this every winter when a family pet wanders onto the ice of a frozen lake. The animal falls through the ice and is unable to help itself. The owner acts upon their emotions and decides to rescue the animal. The end result usually is the owner becomes the fatality and the animal survives the ordeal. The owner died due to an emotionally responded decision. If the owner had used reasoning to make their decision, they would quickly see that they will become the victim. The animal weighs less and fell through the ice, so

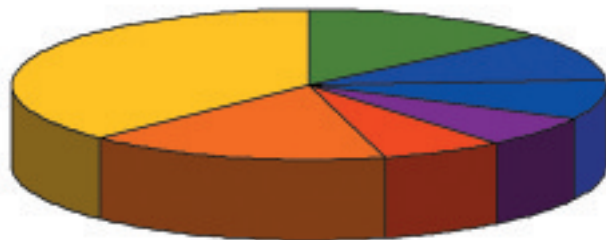
We need to prepare and be prepared. It starts with Entry Preplanning. We need to identify what type of confined space we are entering into.

therefore I will fall through the ice because I weigh more. In a confined space entry incident, there is a reason why the entrant went down. By reasoning and observing the incident, hopefully we can make the right decision. It is also a matter of training our personnel to realize that their safety comes first, the team members/public comes second and the victim becomes third. This is a selfish act but a lifesaving act. If we always put our life and well being first, we will hopefully reduce the number of fatalities of would be rescuers.

So what can we do to reduce these fatalities? We need to prepare and be prepared. It starts with Entry Preplanning. We need to identify what type of confined space we are entering into. By identifying the type of confined space, we are then able to prepare ourselves for the following steps of our process. Knowing what local or provincial regulations dictate is also a must. This will guide you with the preplanning of the entry by filling out the proper paperwork and taking the proper steps to ensure a safe entry. It also involves appointing the right people to oversee and participate in the confined space entry.

Identifying the hazards is an important part of preparing. We need to know what hazards exist inside the confined space. Once we have identified the hazards, we then need to implement a control measure for each of them. This will eliminate the chance of that particular hazard being a threat

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- 37.5% Not Specified

CAUSE OF DEATH BY ATMOSPHERIC HAZARD

SOURCE NIOSH – 1989-1999 – Sample Size 373

to the entrant once the confined space entry begins. We need to prepare for the confined space entry by ensuring that we have the proper equipment on site, that we have adequate number of personnel, set up proper entry procedures, barricade any unauthorized entry and notify all personnel involved of the confined space entry planned for that day. Having an established rescue plan is a must and a legal requirement for

most jurisdictions. This plan will outline what actions are to be taken by the onsite personnel in the event of a confined space entry incident.

Any confined space entry can be a safe one if we are prepared for the entry, use our reasoning skills and keep our emotions in check. This is not an easy task to accomplish overnight and requires discipline with consistency of both training and operational execution. **IFF**

Mark van der Feyst is an 11 year veteran of the fire service. He currently works for the City of Woodstock Fire Department. Mark is an international instructor teaching in Canada, India and the United States. He is a Local Level Suppression Instructor for the Pennsylvania State Fire Academy, an Instructor for the Justice Institute of BC and a Professor of Fire Science for Lambton College. He can be contacted at Mark@FireStarTraining.com

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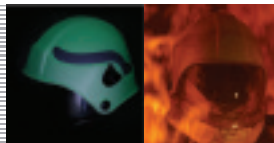
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The original certificate from The Panama Canal Company



Dr Sthamer Hamburg Visit

15th April 2010

Hamburg in Germany is the second largest city in Germany and the port of Hamburg is also the THIRD largest port in Europe next to Rotterdam and Antwerp and the ninth largest in the world. Hamburg is also the home to one of Germany's oldest companies. Fabrik Chemischer Praeparate von Dr. Richard Sthamer GmbH & Co. KG is a company whose history is as impressive as the products that it manufactures.

By Mark Bathard

Sales and editorial
manager, International
Fire Fighter

Dr Sthamer Hamburg as the company is sometimes otherwise known as started back in 1886 by its founder Dr Richard Sthamer. Richard Sthamer was a local chemist who decided to start up his own business manufacturing chemical and pharmaceutical products. The company operated from premises by the River Bille where the company is still located to this day.

The first major international recognition of the company's quality was awarded by The Panama Canal Company in 1915. This was for products supplied between 1904 and 1915 and the original certificate still hangs in pride of place at the company offices.

In the 1920s initial attempts were made to use saponine (an ingredient of soap) as a foam former in the fire extinguishing sector which then resulted in the company entering a new manufacturing line, the production of fire extinguishing foam concentrates. In 1936, the second generation of the Sthamer family Erich Sthamer the son of the founder led the development of protein air foam concentrate. In the following years, there were numerous new developments with patent applications. Between 1950 and 1980 and following the success of the first and second generation Sthamers, Jurgen Sthamer became the third generation member of the family to enter the company. He

PROFILE

Henning Sthamer and Jan Knappert



was instrumental in developing a synthetic alcohol resistant gel film forming foam compound for the first time, whereby a completely new foam concentrate generation was born. In the 1960's further developments in the synthetic and protein foam agent sector followed and in the course of the 1970's, fluorinated additives in particular were combined with protein foam concentrates.

In the early 1980's, Henning and Oswald Sthamer became the fourth generation of the Sthamer family to join the business. This period came with a strong and fast growing environmental awareness within the industry. New developments, modified production processes and raw materials, the company succeeded in developing more

environmentally compatible foam concentrates which led to more patents in 1995.

Today, the company's portfolio is extremely impressive. Virtually all of the major airports in Germany are protected by Sthamer foam and in Rotterdam, the Unified Industrial & Harbour Fire Department which looks after all 32 miles of refineries and petrochemical plants are protected by Dr Sthamer products.

Dr Sthamer invests an incredible amount of resources into research and development, 25% of their entire workforce are committed to research and development. Next year (2011) will be the company's official 125th Birthday. There will be many celebrations to mark this significant event which will start at Interschutz, the worlds largest fire exhibition this year in June.

Factory and laboratory

Mark Bathard, International Fire Fighter's sales and editorial manager visited Dr Sthamer in April this year for a tour of the premises and to get a better perspective of the success of this company. Jan Knappert, Dr Sthamer's international sales director and Henning Sthamer, partner and the fourth generation of the Sthamer family first explained about the history of the company and its roots.

From the warmth of the offices, we ventured outside for a tour of the actual factory and surrounding area. The first thing that I noticed wherever I went was the absolute cleanliness of all areas. "This is absolutely essential" explained Knappert "in the smooth day to day operations of

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Synthetic and raw material storage

the company, cleanliness is absolutely paramount". One asset of Dr Sthamer is the amount of storage facilities they have. The first we came to was the synthetic and raw material storage facilities. The sheer size of the material storage was in itself, spectacular.

The next stop on the tour was the filling room. From here, foam concentrates are put into drums or totes and prepared for shipping to their customers. The concentrates are extracted from "Day Tanks" which are situated on the second floor of the filling room. At full capacity Knappert

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PROFILE

Heptane fire with Class A foam directly applied



explained, and with just one shift of staff, they can produce and store, 1million litres of foam per month.

The last remaining area of the factory tour was where samples of batches of foam that the company have manufactured over the years. These samples are kept for a minimum of ten years, itemised in year order as well as numbered by the batch made. Every single batch of foam that Sthamer produce a sample is kept and it even tells you how many litres of that batch were made.

The lab area was to be the final part of the tour with Dr Matthias Prall, Dr Sthamer's chief chemist also performing a series of small demonstrations. There were to be four small demonstrations the first with a Class A foam premix to be used on a small pan fire with Heptane which is a standardised test substitute for gasoline. The second test would be with a standard AFFF also on Heptane. This would be a comparison test to the standard Class A foam so that we could see the difference in extinguishing time as well as the film



AFFF on an alcohol based pan fire

forming properties of the AFFF. The third test was to be an AFFF test on an alcohol based fire to prove that alcohol resistant foams are the correct foam to use on alcohol based fires. This fourth test would be with an alcohol resistant foam with a direct application and then half way through, a gentle application. This would demonstrate how the Sthamer foam AR-AFFF lays a polymer film which the foam can then travel on and extinguish the fire. As with all alcohol resistant foams a direct application, the polymer film does not have a chance to form.

The results of the test to someone like myself were quite impressive. As a publisher and not an expert in the foams industry, I was quite taken aback by the extinguishing capabilities of the Sthamer products. The one part of the test that I really found impressive was the pan fire with alcohol burning. The AFFF started to produce a blanket over the burning liquid but being that the product is not alcohol resistant, holes appeared seconds after the delivery of foam had stopped and where the hole started, burn back or re-ignition of the alcohol was possible. The Sthamer alcohol resistant foam however was a different story. I could actually see the film forming over the alcohol fire and the foam blanket running over the top of the film it took less than 20 seconds for the fire to be extinguished. Dr Prall then took a lit burner and tried to re-ignite the liquid underneath but this proved not to be possible due to the capabilities of the alcohol resistant foam.

These small demonstrations made it abundantly clear that it is no wonder that places such as the refineries of Rotterdam who store millions of gallons of alcohol based products are protected by Sthamer foams. There is no question that a lot of research and development has gone into the production of their alcohol resistant foams making it safer for the fire fighting crews should they be involved in an incident involving a fully involved tank fire.

IFF

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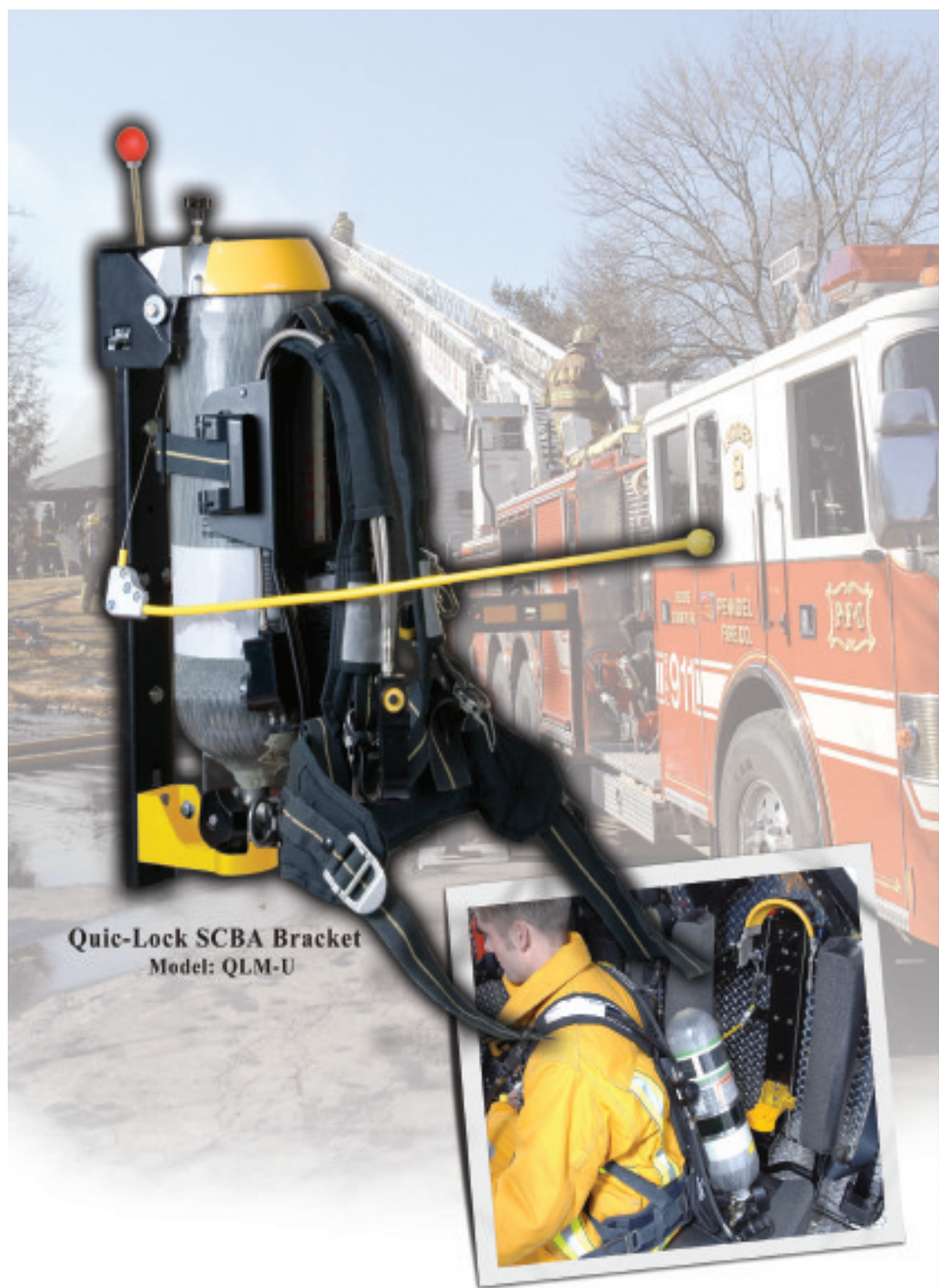
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INTERSCHUTZ 2010

Held once every 5 years, anyone and anybody involved in the fire safety and fire fighting industry will be in Leipzig, Germany between the 7th and 12th June 2010 attending this prestigious event. IFF takes a look at some essential information for visitors as well as exhibitors attending Interschutz.

VISITOR INFORMATION

INTERSCHUTZ 2010, 7 to 12 June

At a glance

Duration:

Monday, 7 June to Saturday, 12 June 2010

Opening hours:

Daily from 9.00 a.m. to 6.00 p.m.

Admission prices:

Advance sales and Ticket office

Single admission 18.00 EUR
Full-event ticket 41.00 EUR
Student's day ticket (incl. young people
in military or civilian service: ID required)
11.00 EUR

Tickets can be bought in advance via the Internet
(www.interschutz.de)

Free ride to and from event

Your admission ticket entitles you to ride public transit free of charge* on the day of the event on all lines operated by the MDV transit authority (Mitteldeutscher Verkehrsverbund), valid for the following regions and fare zones:

MDV fare zones

*The visitor's free ride to and from the exhibition center via MDV-operated public transit lines on the day of the event is valid for the following regions and fare zones:

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Catalogue:

€17 plus postage and packaging (available approx. 3 weeks before opening day of event)
Internet: <http://www.interschutz.de/catalogue>

Visitor information:

Internet: <http://www.interschutz/visitorservice>
Email: interschutz@messe.de

Getting there:

If traveling by car, simply follow the signs to the exhibition center (Messegelände) in and around

Leipzig; the Leipzig exhibition center is well sign-posted. Our dynamic parking guidance system will point you to the nearest parking space.

If traveling to Leipzig by train, you can reach the exhibition center (Messegelände) from Leipzig Central Railway Station (Hauptbahnhof) by taking the regional train, the FlughafenExpress train, the tram or a taxi. For more information, please inquire at the Service Point desk at Central Railway Station.

Numerous airlines serve the Leipzig/Halle Airport. There are over 300 direct flights to and from eight German cities and 72 cities abroad. Leipzig/Halle Airport also gives you easy access to the following major international airport hubs: Frankfurt, Munich, Paris and Vienna.

Travel and accommodations:

Do you prefer a quiet's night sleep, or would you rather be close to Leipzig's pulsating nightlife? The Leipziger Messe company can provide you with recommendations and reservations for any location or price category. Your selection of accommodations ranges from hotels, pensions and guesthouses with a total of 12,000 beds between them – from "shoestring budget" to luxury. For more information, visit www.interschutz.de/61050.

Parking:

The press parking lot for journalists at Leipziger Messe is located inside the exhibition grounds next to the Messehaus building. The parking lot is accessible via Messe-Allee, South 1 gate.

Range of exhibits:

Vehicles and vehicle equipment, fire extinguishing appliances and systems, fire extinguishing agents, technical support and environmental protection, rescue, emergency, first-aid and medical equipment, personal protective equipment, measuring and detection apparatus, control-station and signaling technology, information and organization, equipment for fire stations and workshops, building and construction industry, structural and organizational fire protection, associations, organizations, service companies, technical literature, model making, fan articles, gifts.

Exhibitors:

The organizers anticipate some 1,100 exhibiting enterprises, occupying more than 80,000 m² of net display space.

Press Center:

At the Messehaus building, open from Sunday, 5 June 2009, starting at 9:00 a.m.

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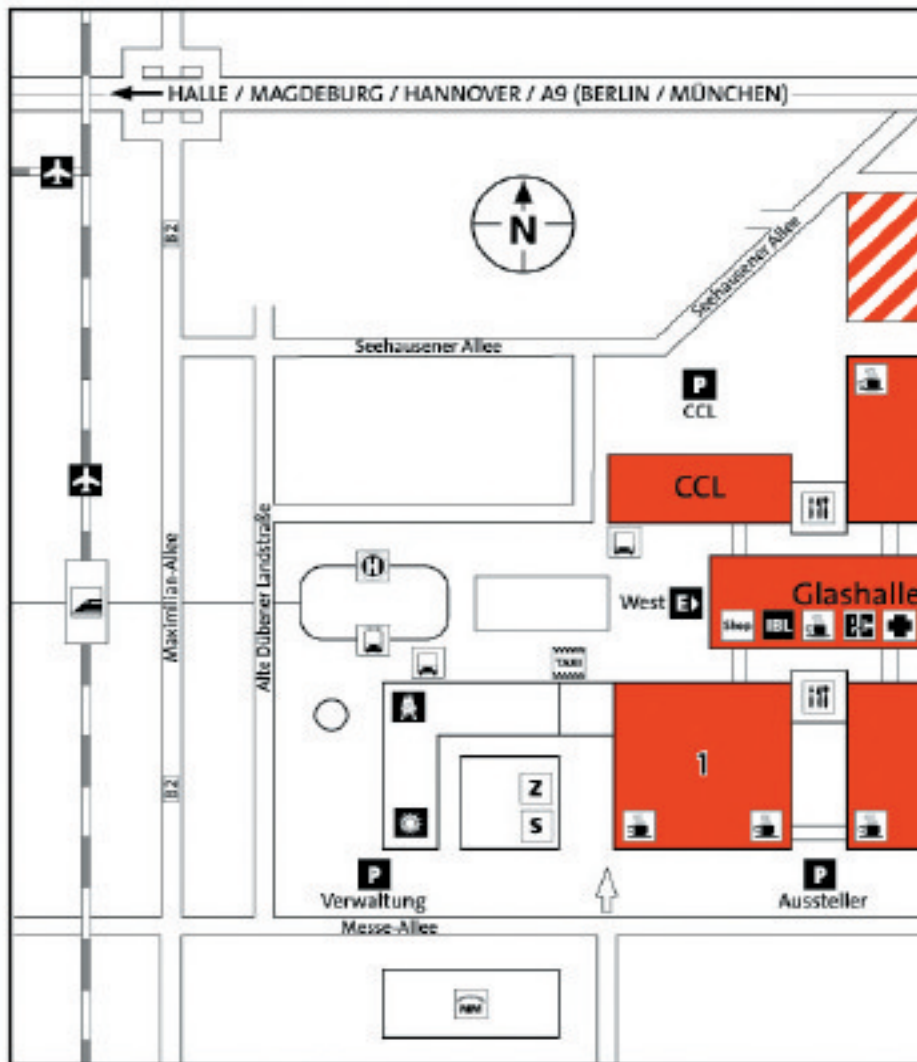
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32798 Horn-Bad Meinberg • Germany

Phone: +49 (0) 52 34/89 66-0

Fax: +49 (0) 52 34/9 80 35

info@isotemp.de • www.isotemp.de



Display Categories INTERSCHUTZ 2010

Vehicles and vehicle equipment
Hall 1, 2, 4 + Open-air ground 1

Fire extinguishers appliances and systems, extinguishing agents
Hall 1, 5

Technical support and environmental protection
Hall 1, 2 + Open-air ground 1

Rescue, emergency, first-aid and medical equipment
Hall 1, 2, 3 + Open-air ground 1

Personal protective equipment
Hall 1 and 3

Measuring and detection apparatus
Hall 3

Control station and signaling technology
Hall 3

Information and organization technology
Hall 3

Equipment for fire stations and workshops
Hall 1, 5

Building and construction industry, structural and organisational fire protection
Hall 1, 5

Associations, organizations, services
Hall 1, 2, 3, 5

Trade literature, model making, gift items
Hall 1, 2, 4

The benefits of exhibiting at the show

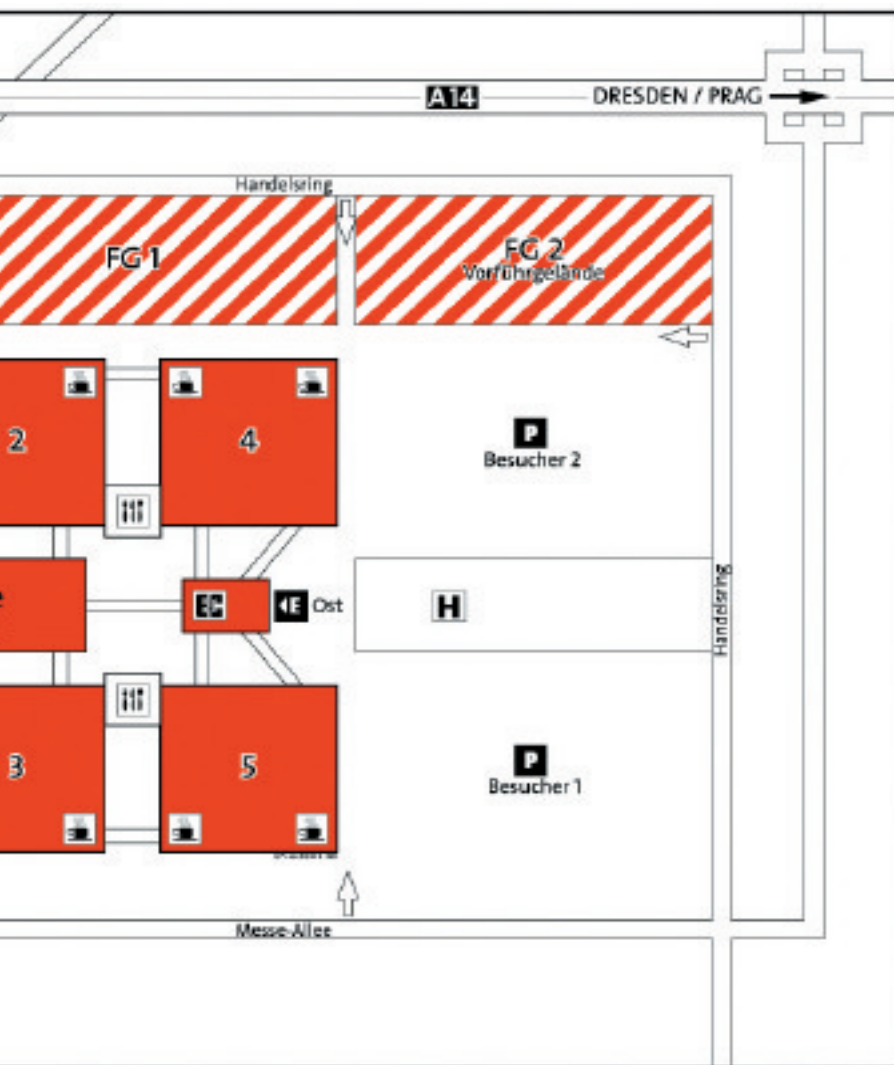
The No.1 event in the industry calendar

With more than 120,000 visitors and over 1,200 exhibitors, INTERSCHUTZ is the leading international trade fair for public safety. Featuring the world's largest array of exhibits for disaster prevention, rescue and emergency services, INTERSCHUTZ offers you a fantastic opportunity to demonstrate the competence of your company and

organization to the entire industry – with just one trade fair presentation.

Unique concept

Due to the combination of commercial and non-commercial exhibitors under the same roof you benefit as a supplier from direct feedback from the users of your security solutions. This puts you in an excellent position to fine-tune your product range to meet



changing market needs.

Efficient business platform

With over 90% of visitors classed as trade visitors, you can be certain of reaching large numbers of decision-makers and buyers. This makes INTERSCHUTZ an ideal platform for successful new product launches and business deals.

International audience

At INTERSCHUTZ you'll meet top decision-makers from all over the world. This gives you ready access to profitable new markets.

Barometer of trends

Learn about pioneering innovations and key trends within the industry at the conferences, symposia and corporate lectures that accompany the show. You'll benefit from the professional expertise of leading experts and gather useful information for shaping the future course of your company and organization.

Attention guaranteed

An extensive advertising campaign and an attractive program of events serve to generate and maintain the interest of visitors and the media.

Excellent facilities

The modern exhibition complex in Leipzig with its fascinating steel and glass architecture provides you with

Press Centre Entrance	Station Leipzig Messe
EC-Cash dispensing machine	Heliport
Business Lounge	First aid
Restaurant	Fair shop
Parking	Shop Café
Airport-City-Shuffle	Police
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everything you need in terms of both organization and technical facilities.

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LEIPZIG 7. - 12. JUNI 2010

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Fax: +49 (0)7123/1704-44 www.seiz.de

ALBANY FOAM PUMPS



HALL 5, STAND A68

Albany Pumps make very compact, robust foam concentrate pumps. Albany supplies foam pumps for fire trucks, marine, off-shore, petrochemical and industrial applications worldwide.

Albany offers a range of foam pumps for 21 bars pressure at flows up to 1400 l/min.

Used on Fire Trucks, high-pressure Albany foam pumps are driven by the vehicles' power take off or by a hydraulic system.

Albany supply Fire Trucks with 24V DC battery driven foam transfer pumps. Designs are made to be air, petrol or diesel engine powered when needed.

Economical water powered foam pumps are made in several models. Lightweight turbines are used for portable pumps to 200 l/min. A new compact turbine powers foam flows to 600 l/m. Long coupled Pelton wheel pumps extend the range to 1400 l/min.

Albany is ISO 9001:2000 approved and has specialised in supplying API 676 standard foam pumps for the oil and petrochemical industry. Albany makes a range of twin-screw pumps to extend its range of high-pressure foam pumps to over 4000 l/min. These quiet pumps give pulse free flows and have been used on oil and gas platforms.

All Albany foam pumps can be supplied in Bronze or Stainless steel. We supply in-built relief valves and flanged or screwed connections, to meet customer requirements.

From 100 years of gear pump manufacture Albany have a library of successful designs and can offer versatile solutions for all foam pump enquiries.

**Stand personnel: M G D Swaffield
G H Maxted**

ALBERT ZIEGLER



HALL 4, STAND D/E 78

Albert Ziegler GmbH & KO. KG, Germany's leading manufacturers of fire service vehicles, pumps and hoses will demonstrate their capabilities during the

INTERSCHUTZ 2010 in Leipzig from June 07-12, 2010 in hall 4, stand D/E 78. ZIEGLER's experience gained in nearly 120 years of close cooperation with fire departments worldwide has established the company's excellent reputation. Standard as well as special fire trucks including the extraordinary Z-Series of airport fire fighting and rescue vehicles (AFFR) will be shown in Leipzig together with interesting components for fire trucks and a wide range of fire fighting equipment.

It goes without saying that ZIEGLER is consequently accepting the challenge of making the jobs of fire fighters safer and more efficient by providing high quality and technologically advanced solutions to meet all kinds of incidents which might occur in fire departments. New technologies and operational features found their ways into standard vehicles according to DIN, having been successfully tested in special vehicles with proven reliability. Special attention is paid to the safety of fire fighters during their transport to and from the incident and the handling of their equipment. Logical and easily to operate controls guarantee a smooth operation under all conditions and assist the staff to avoid any mistakes.

But not only fire trucks are displayed on ZIEGLER's stand on the INTERSCHUTZ: modern fire hose maintenance facilities, portable and vehicle mounted pumps, various monitors and foam admixing systems -just to name a few categories – can be seen and investigated in detail.

Ziegler will be present in Leipzig with numerous and qualified personnel to inform interested visitors and show and explain the striking novelties. Everybody is welcome to see us, to look around, and to become convinced that we keep our promise: 'ZIEGLER – we provide safety'!

AMKUS



HALL 3, STAND B70

Amkus has been providing state-of-the-art hydraulic extrication equipment and rescue systems to Departments around the world for over 30 years. AMKUS is proud to be certified as an ISO 9001 company. We have designed

tools to meet industry standards including NFPA 1936 and the European Norm. We are continually improving existing products and introducing new innovative tools to make extrications safer faster and easier to perform.

AMKUS will display their full line of extrication equipment at Interschutz 2010. Our most recent additions include the AMK-22 C.O.T (Cutter of Tomorrow) and the AMK-24 Spreader.

The AMK-22 Cutter is designed to handle the stronger materials used in new model vehicles, such as Boron Steel, Martensite, and other high strength steels. The AMK-22 Cutter also features a 360 degree rotating handle with 8 locking positions allowing the



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rescuer to position the handle for natural hand placement at any angle of attack.

The AMK-24 Spreader is a remarkably compact and lightweight high performance rescue tool. The AMK-24 features innovative push button pins for easy tip removal, which eliminates the possibility of losing pins in the field! Increase the spread over 20 cm in an instant with the addition of the Extended Reach Tips. The unique construction of these tips eliminates loss of power while providing extended reach.

**For more information visit
www.amkus.com or contact AMKUS
directly at 1-630-515-1800.**

ARGUS THERMAL IMAGING



HALL 3, STAND D57

At Interschutz this year Argus thermal imaging will be celebrating thirty years of providing sales and service to the world's fire fighters.

We were the first to introduce handheld thermal imaging cameras to the world and at Interschutz, we will be the first to provide a high resolution thermal imaging at the same purchase price as many low resolution options on the market. You get more for less with the Argus4 320, a high spec camera, with high resolution imaging sensor, HD LCD screen and capable of detecting temperature variations in a fire scene as high as 1000 degrees Celsius. The new Argus4 320 is an upgrade to the highly successful standard Argus4 and is without doubt an extraordinary value.

Argus will also be launching the new Argus LRT long range video transmitter, a long range telemetry system like no other. Our new accessory simply replaces the camera battery and allows on-scene incident commanders to see live images from the inside of the fire scene. The Argus LRT transmits clear, secure thermal imaging video footage. From tower blocks to subterranean tunnels, it helps you get a better view of a fire situation.

- Designed using COFDM technology for a secure transmission

- Noise free quality picture
- Up to 1km range
- Integrated into camera battery

Visit it our stand or a full demonstration of our cameras and exciting new technology.

AWG FITTINGS



HALL 4, STAND C36

A dangerous job like fire fighting requires products you trust. AWG Fittings has products you can rely on to keep you safe while you do your job saving other peoples' lives! AWG offers a full product line of couplings, LDH equipment, nozzles, branchpipes, monitors, suction hoses, strainers, dividers, siameses, pumps and valves as well as end-to-end solutions for mobile and stationary fire prevention systems. Combining innovation and technology with first class quality, AWG offers premium fire fighting appliances and accessories worldwide. Our products are simple to use, robust and reliable, with consistent high quality. We are constantly developing further in order to incorporate the latest technologies into our marketable products. Take advantage of this know-how, which is also available to you in the form of qualified consulting and for creation of individual products. AWG – you can depend on! Know how from which you will benefit.

BRISTOL UNIFORMS LTD



HALL 3, STAND B47

Bristol Uniforms, one of the world's leading designers and manufacturers of personal

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protective equipment (PPE) for firefighters and other emergency services, supplies products to firefighters in over 110 countries in partnership with an international network of over 70 distributors. Their local market knowledge has been, and continues to be, one of their particular strengths. This has enabled Bristol to develop close relationships and an ability to recognise, interpret and design specialist protective garments to meet international standards and provide bespoke variants to meet local specifications.

Bristol offers a comprehensive range of protective clothing for structural, industrial and marine firefighting, specialist technical rescue garments, including urban search and rescue (USAR), and lightweight protective garments for wildland firefighting. Structural garments are all manufactured to appropriate standards including EN469:2005 (Europe); NFPA 1971:2007 (USA) and ISO 11613:1999 (International). Wildland and USAR PPE meets general flame standard EN ISO11612.

Garment wearer safety has increasingly become the focus of employment legislation, placing responsibility for lifetime PPE performance integrity squarely on employers. Appropriate washing, repair and decontamination of firefighter clothing depend on professional inspection and maintenance programmes. Bristol, using its technical expertise and in-depth experience of PPE performance, provides managed services to many UK fire & rescue services. Growing interest in other countries has extended provision through appointed distributors. Suitably trained and equipped staff carry out, or outsource, this specialist service for fire and other emergency services helping to ensure that their PPE is fully fit for purpose throughout its service life.

BRONTO SKYLIFT



STAND B & C 120

Bronto Skylift, the leading manufacturer of truck mounted aerial platforms offers a

lot to see at its stand B & C 120 at Interschutz.

The main attraction will naturally be the brand new record-breaking F 112 HLA, the world's highest truck mounted aerial platform with the working height of 112 meters. The operational data of the unit will be published only shortly before the exhibition.

Other exhibits include for example:

- Aerial ladder platform with 32 m rescue height, TLK23-12 with completely new design.
- F 42 RLX, the 50th Bronto rescue & fire fighting unit delivered to Austria. The unit has max. rescue height of 42 meters and an outreach of 19 meters at the height of 30 meters with 400 kg cage load – but is still compact in travel position with the height of only 3.6 meters. The unit is in operation at the fire brigade of Mödling.
- F 44 RPX with Bronto-FoamPro foam mixing system. The system is a fully automatic, microprocessor controlled direct flow based proportioning system and offers an unrestricted water and foam flow with extreme accuracy.

Technology Innovations

In addition to new aerial applications Bronto Skylift aims to develop the features of the applications to enhance safety, efficiency and easy serviceability.

The new concept Bronto Care offers total life cycle management for the machines.

Through Bronto extranet (@Bronto) we provide proactive product support. Online support (TeleCare) allows diagnosis and adjustment of operational parameters through GSM network.

All Bronto Skylift units have Bronto+ electronic control system. Bronto+ is a user-friendly control system allowing the operator to determine – without lifting the ladder set – whether a particular aerial object can be reached. The system displays all operational parameters such as the chosen max. rescue cage load, the outreach and height, the boom angle, the wind speed, and additionally it gives full trouble shooting information. The Bronto+ has been upgraded with several innovations which will be presented at Interschutz.

Also at the stand: Bronto Mobile Workshop, full equipped Customer Service Center that can be transported wherever

thorough refurbishment or repairs are required.

At Interschutz Bronto Skylift also launches the Bronto Operator Licence which is granted to operators passing the training course of Bronto Skylift.

CEOTRONICS



HALL 3, BOOTH 86

Rödermark, March 2010 – Ease of use, universality and quality; that's what two-way radio users expect from their accessories. Exactly that and even more is what the CT-MultiCom delivers.

The new universal remote unit from CeoTronics for two-way radios is more than a speaker mike as it also offers additional accessory ports: not only a 3.5 mm jack socket for an earplug; the CT-MultiCom also comes with a fully featured 4 pole jack socket to connect various CeoTronics communication systems.

The large surface PTT on the front covers nearly 50% of the surface and can thus be conveniently operated with thick gloves, with the elbow and even under clothes. The PTT which as standard comes in black can also be ordered optionally in orange.

When supported by the connected radio the two soft-keys can be individually programmed: e.g. mute, emergency call, channel selection or the switch from TMO/DMO (Trunked to direct mode operation) can be set. Depending on the connected radio a LED gives the user a visual feedback of the status. The power to operate the CT-MultiCom is supplied by the connected two-way radio. On the back the CT-MultiCom provides a robust 360° belt clip to fix the remote unit to the clothes.

The CT-MultiCom is certified IP65 (dust and hose proof) according to EN 60529; offering a high protection even in the standard version. The multifunctional remote unit can also be ordered in ATEX with protection class II 2 G Ex ib IIC T4 (94/9/EG).

In the name CT-MultiCom 'multi' stands for multipurpose; 'CT' stands for quality and innovative ideas of CeoTronics. No other remote hand mike PTT unit facilitates the



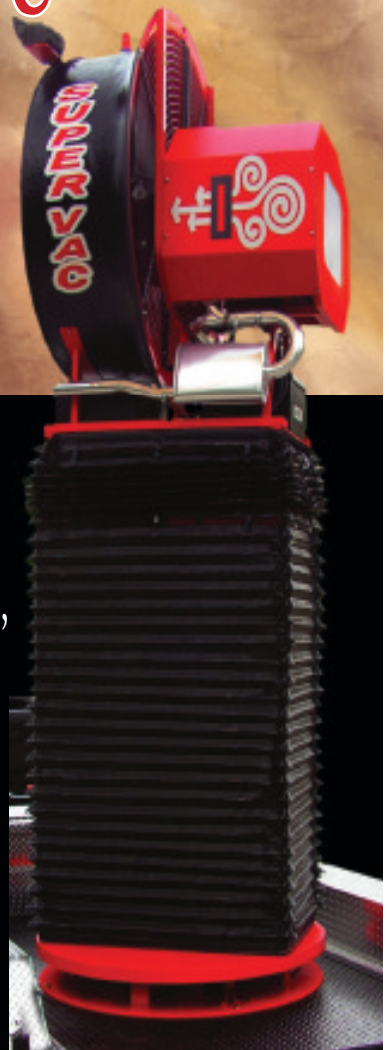
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two-way radio usage that much", explains Berthold Hemer, CTO and head of CeoTronics' R&D.

Further information:

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CET FIRE PUMPS MFG



HALL 3 STAND E75

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CET Fire Pumps designs, engineers, manufactures and delivers portable fire fighting pumps, compressed air foam systems, skid units, foam trailer, and urban interface brush fire fighting vehicles.

Portable Pump

Power that meets your requirements. More than 30 models available.

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- Mid-Range Pumps
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CAFS (Compressed Air Foam System)

The CET CAFS provides a self-contained, diesel-powered, "Slide-In" type compressed air foam system (CAFS) unit.

The CAFS unit is designed to fit into the back of a standard length and width pick-up truck body, to discharge water only, air only, or compressed air foam from the same discharge outlet. In addition, the consistency of the compressed air foam (expansion ratio), wet/dry is fully adjustable.

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CHEMGUARD



HALL 3, STAND C76, BOOTH NO. C4

Chemguard Leads with Innovative Products, Comprehensive Support

Chemguard is a full-service ISO 9001:2008 certified manufacturer of UL and FM approved fire suppression foams, equipment, and systems.

Chemguard's Fire Suppression Division has been researching, developing, formulating, and distributing high-quality, dependable fire-fighting foam concentrates for more than two decades. Our efficient and environmentally friendly UL Listed/FM Approved foam products are used worldwide. Chemguard performs topside and sprinkler fire tests for a wide variety of test standards at our onsite Fire Test Facility. We have obtained international approvals for Chemguard foam concentrates, including IMO, DNV, LASTFIRE, and EN 1568.

Chemguard designs and manufactures an extensive line of fire-fighting foam hardware, including nozzles, monitors, and foam trailers. We also offer on-site product fabrication, including ASME bladder tank and

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You will find us at stand B36 in Hall 004.**

custom foam skid fabrication. Our intensive quality control procedures ensure that equipment shipped from Chemguard reflects our reputation for excellence and is delivered on-time at competitive prices.

Chemguard's systems engineers provide fire suppression systems design and applications assistance – reviewing specifications, providing value-added engineering alternatives, and supporting systems start-up. Working side by side with customers, we apply our years of experience designing systems for petrochemical facilities, hangars, flammable-liquid storage tanks, warehouses, and other challenging installations to maximize performance, efficiency, and effectiveness.

The Chemguard Specialty Pumps Division manufactures a complete line of UL Listed/FM Approved positive-displacement foam concentrate pumps for fire-protection systems. Based on a proven design with several unique features, these durable pumps are built for years of dependable operation.

Chemguard's research-based Specialty Chemicals Division produces a rapidly expanding selection of fluorosurfactant and hydrocarbon surfactant specialty chemical products for formulating all types of fire-fighting foam products.

Known around the world, Chemguard is recognized for comprehensive customer support, high-quality and field-tested products, and the ability to meet customer requirements through product customization.

Contact details:

Vice President of Sales and Marketing:

John Vieweger

jvieweger@chemguard.com

including the SNOZZLE™, refined from decades of airport firefighting and proven internationally to be the standard HRET for ARFF. The versatile SNOZZLE™ is a 50 ft or 65 ft waterway with single or dual nozzles. Adapted for pumpers, the Municipal Snozzle has short outriggers, remote controls, is mid-ship mounted, and offers optional piercing nozzle, FLIR camera, and LED lights. The RMT, an unmanned portable hangar and warehouse protector, uses its electronic flame detector to automatically deploy cold air compressed foam (CAFS) to the target area to extinguish the fire. TRI-MAX® twin-agent fire systems are flexibly designed as skid units to transform any small vehicle into a fast response fire truck. Crash Rescue is the builder of rugged Renegade twin-agent small trucks, custom designed for military, commercial, industrial, and municipal fire-fighting. Renegade fast attack vehicles are light weight, highly maneuverable, with exceptional stand-off distance. Its F.L.I.R./Pan & Tilt camera option on the bumper turrets and built-in CAFS technology make the Renegade extremely effective responders. The Fire Wagons® division offers a variety of customized trailers for applications such as Command trailers, Decontamination units, Haz Mat trailers, Communications, Medical/Surgical units, and more. Crash Rescue, a leader in fire apparatus innovation, is the worldwide leader in the remanufacture of all brands of ARFF vehicles; "REBUILD" either reconditions or completely rebuilds from the frame up, often upgrading to meet current standards. When airports have urgent need of a fleet solution, Crash Rescue is the primary ARFF Leasing resource, with more than 40 years of proudly serving the international fire service.

CRASH RESCUE



HALL 3, STAND B76, (USA PAVILLION) STAND B7

Crash Rescue is the Texas-based manufacturer of specialized firefighting apparatus

CTE



AREA FG, STAND B143

CTE show the B-FIRE 330 at INTERSCHUTZ 2010

During Interschutz 2010 at Hannover, CTE will be showing the B-FIRE 330 a truck-



mounted platform specifically engineered and built for fire fighting and rescue operations. It is available with or without the side ladder and comes with a wide range of options to satisfy the most demanding working conditions.

The most important technical specifications of this machine are the maximum working height 32.5 metres, cage capacity 450 kg and third boom articulation.

The B-FIRE range of platforms of 32 and 55 metres height represents the finest technology available for emergency and fire prevention use.

Equipped with an emergency ladder and a water/foam line, the B-FIRE truck mounted is the best combination between aerial platform, emergency ladder and fire prevention truck. All fire fighting models are equipped with a main jib (non-telescopic) and a second jib.

The main feature of the machine is the high operating speed, which is always needed by operators during emergency situations.

CTE exhibit their B-FIRE platforms at Interschutz, Area FG Stand B143.

W.S. DARLEY & CO.



HALL 4, BOOTH B52

Founded in 1908, W. S. Darley & Company is a manufacturer and distributor of fire-fighting pumps, fire apparatus, and fire-

fighting equipment. They remain a family owned and operated company. Darley has a current customer base of more than 50,000, which includes federal, state and local governments as well as customers in over 100 countries. Darley is headquartered in Itasca, Illinois and has manufacturing, engineering and operations in Chippewa Falls, WI, Janesville, IA and Toledo, Oregon. Darley was recently awarded major contracts by the Department of Defense to provide our forces with fire fighting, rescue and special operational equipment. They are introducing a new low cost line of CAFS and Purifire Water Purification Systems at this year's Interschutz. Request a free copy of our 2010

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DR STHAMER – HAMBURG



HALL 5, BOOTH G74

One of Germany's oldest companies and Europe's leader in Fire Fighting Foam Concentrate Technology, will be displaying their latest developments in fire fighting foams and how they should be used utilizing several interactive displays.

Dr Sthamer has the full range of Fire Fighting Foams to protect you assets, including the latest generation of Fluorine Free Alcohol Resistant Foams.

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jknappert@sthamer.com

DRÄGER



HALL 4, BOOTH C04 AND OPEN AIR AREA A119

At Interschutz Dräger will launch a broad range of new personal safety equipment for fire fighters. The company will show 11 new products on its booth. Dräger's extensive portfolio including respiratory and chemical protection equipment, fire training systems and mobile gas detection systems will be

divided into the areas rescue, protection, fire fighting and recovery. In addition a demonstration fire station's workshop for breathing apparatus will be part of the Dräger stand.

In its open air area Dräger will host a dynamic acrobatic show featuring the new Dräger fire fighting equipment and several expert talks.

For further information please visit www.draeger.com/interschutz

FSI®



HALL 3, BOOTH C27

FSI® cordially invites you to visit us at our booth – Hall 003 Booth C 27 – at Interschutz in Leipzig Germany June 7-12. FSI invites new and old clients and friends to join us at this major international trade show held only every 5 years. FSI seeks distributors and manufacturer representatives worldwide.

FSI North America® offers amongst the world's largest range of Portable, Mobile, and Fixed Decontamination Emergency Shower Systems, Shelters, Isolation Shelters, Medical Surge Capacity/Field Hospital Systems, and Accessories – all designed to meet the rigorous demands of Homeland Protection personnel worldwide.

FSI offers a broad array of EMS supplies inclusive of an economy and premium range of medical field cots, mortuary supplies, body bags, and the FSI Transporter™ range of Disposable Back Boards, Head Immobilizers, and Transport Boards.

Also offered are MCI Trailer Systems, Rescue Boats, PPV Fans, Safety Tank Showers, Chemical Suits, and Decon Solutions.

FSI will exhibit a variety of the aforementioned products with an emphasis on Decontamination shower systems of various sizes, Shelter systems composing mobile field hospital systems, and various EMS items that are patented pending inclusive of the FSI Transporter® series of disposable backboards, and the medical field cot range.

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Smooth Bore

Container Fog

Fog

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...

The Turbo Twist Nozzle offers multiple interchangeable tips, for endless applications in fire fighting. The quick connection system takes only seconds to change tips and locks into place with stainless steel pins to prevent unintentional breaking apart. It is compatible with water, foam and other extinguishing agents. The rugged aluminum nozzle is available in 1½" or 2½". The Turbo Twist prepares fire fighters for every job or situation!

AWG - Max Widenmann KG

Phone +49(0) 7322 145-0

Fax +49(0) 7322 145-29

service@awg-fittings.com

www.awg-fittings.com

HAZTEC



HALL 2, STAND A61

Haztec International Limited specialises in the manufacture of lightbars and other audible and visual warning systems for vehicles. The Haztec product range includes lightbars, arrowbars, electronic message boards, sirens, scene lights, work lights, beacons and directional warning lights.

Flexible UK based manufacturing enables Haztec to regularly provide customised or even bespoke products to suit specific requirements. High levels of component stocks and a dedicated fast response production area are used to ensure that products are available when needed, whilst still maintaining maximum efficiency on large production runs. Haztec offers a full range of light technologies from Halogen to LED, many of the products have been independently tested and certified to EC65. Visit Haztec in Hall 2 at stand A61.

HOLMATRO



HALL 2, STAND E26

What's next?

Come and see Holmatro's latest innovations at Interschutz.

This is the year of Interschutz, the largest fire and rescue exhibition in the world. Interschutz has always been the perfect international platform to present our latest innovations to the rescue world. After the introduction five years ago of CORE™ Technology, the revolutionary one hose system, it is time to show you some exciting new products and technologies. Come and see us at our stand (E26 in Hall 2) at Interschutz to find out what's next...



Throughout the years Holmatro has supported rescuers all over the world with rescue tools and technologies that have made their working procedures quicker, safer and easier. Innovation is at the heart of Holmatro and one of the things expected from us. So also this year, at Interschutz 2010, we will not let you down!

Find out what's next...

2002: First New Car Technology (NCT™) cutters, specially developed to cut the hard materials and reinforced constructions found in modern cars. Their U-shaped blades easily surround wide B- and C-posts and pull material into the cutting recess, allowing it to be cut at the strongest point of the cutter.

2005: Introduction of CORE™ Technology, Holmatro's revolutionary one-hose system. High-pressure hose inside and protected by low-pressure hose. Para-aramid reinforced: no kinking, no pinholes, easy (un)rolling.

2005: New flat central bolt construction on cutters and combitools. Squeezes the blades together more tightly, resulting in less blade separation and an improved cutting performance. The i-Bolt also provides better access to narrow spaces.

2005: Integrated LED lighting in carrying handles. Never work in your own shadow again.

2005: Speed Valve on spreaders and rams for quicker tool opening. Saves valuable time.

2010: What's next? Find out at Interschutz 2010, June 7 – 12, Leipzig, Germany. Holmatro stand: E26, Hall 2.

For more information visit our website:
www.holmatro.com/rescue

ISG



HALL 3, STAND E28

ISG is the world-leading provider of fire-fighting and search & rescue thermal imaging cameras. We have been developing thermal imaging technology for almost two decades and are very proud of our dedication and service to the industry.

Our innovative products incorporate some of the world's most advanced imaging technologies, many of which are exclusive to ISG. We offer a broad range of thermal imaging cameras, suitable for use in fire-fighting, search & rescue, surveillance, detection, and many other applications. We specialise in providing industry-leading enhancement of the image quality of the thermal scene, allowing you to see more detail, and make better-informed decisions, even in the most extreme environments.



Our exceptional range of products are simple to use, with a variety of fully automated features installed to provide maximum information with minimum intervention. In addition, we offer several optional features to help further enhance your product to suit your desired needs. To find out more, please visit our website at www.isgfire.co.uk or call us on +44 (0) 1268 52 77 00. Alternatively, you can come and visit us at Stand E28 in Hall 3 at Interschutzh 2010 for a demonstration.

ISOTEMP®



HALL 3, BOOTH A62



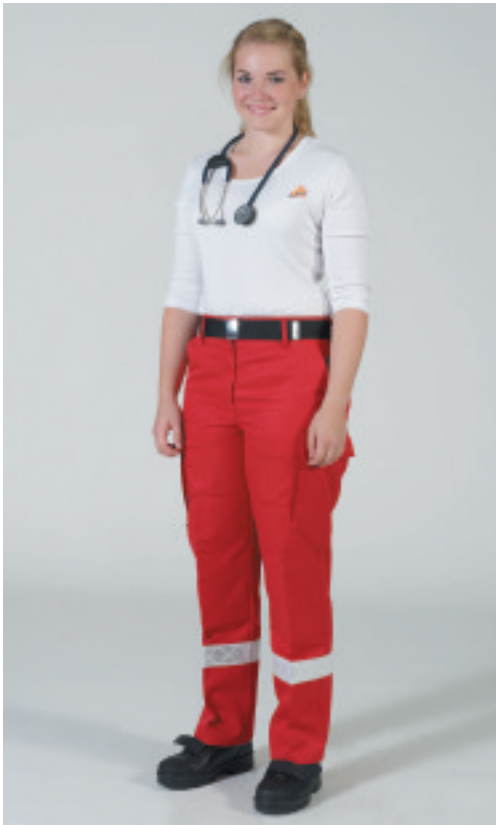
Horn-Bad Meinberg. The Heinrich Vorn-damme OHG is exhibiting their products in Leipzig, Germany at the international Trade Fair for Rescue, Fire-/Civil Protection INTER-SCHUTZ 2010. Six days, from June 7th to June 12th, 2010 all ISOTEMP® and FIRE WOLF® products will be exhibited in hall 3, booth A62.

The Heinrich Vorn-damme OHG has been producing special protective clothing for the fire departments and the industries for over 100 years. With close to 100 employees at their German headquarters, Heinrich Vorn-damme OHG is placing great value on the high quality of their products. The value on high quality is reflected through purchase of high-quality materials and certified quality assessment.

Working together for your safety.

Safety requires real-time information and monitoring. The Dräger Bodyguard® 7000 electronic unit is a key element of the Dräger PSS® 7000 personal safety system. It combines innovative ergonomic design with advanced monitoring and warning features. Dräger Bodyguard® 7000: safety in the palm of your hand. Interested? Take a look at the innovative system solutions of Dräger under www.draeger.com

Dräger. Technology for Life®



During INTERSCHUTZ the company is going to introduce the new version of their Fire Fighter equipment FIRE WOLF®. This coat in shorter version than its predecessor is offering a better fit and is comfortable to wear. For the Fire Fighter pants FIRE WOLF® the company will introduce a new sus-



pender system. The FALCON model series for Fire Departments and Industries now comes next to certification according to EN ISO 11612 – garments for protection against heat and flames (succession norm EN 531) also with certification according to EN 1149-5 protective clothing – electstatic characteristics as well as clothing for protection against arcing fault. New in the program will be the knee breeches-FALCON of NOMEX® III as a customized equipment version for the emergency service.

A new material will also be introduced via the chemical protection suit 4400. This suit is produced with a new double-sided protection fabric with dual barrier film and is currently under certification process according to EN 943-2 (suit type 1a ET). This chemical protection suit carries the approved equipment characteristics such as helmet fixation and overshoe system. The head piece in its comfortable design is offering latest helmet types according to EN 443:200 sufficient room. The suit is available as a customized version with switching valve, which is supporting the wearer of the chemical protection suit with sufficient air while going through decontamination.

The entire product line of ISOTEMP® Decontamination Systems will be exhibited in hall 5, booth C06 at the booth of the Federal Association Operation Fire Protection – Fire Department Association Germany e.V (WFV – Bundesverband Betrieblicher Brandschutz – Werkfeuerwehrverband Deutschland e.V).

For more information on the Heinrich Vorndamme OHG please visit www.isotemp.de

KIDDE FIRE TRAINERS



HALL 5, BOOTH 89, OUTSIDE AREA ON STAND C70

Interschutz 2010. Kidde Fire Trainers, part of UTC Fire & Security will have their corporate booth in Hall 5 booth 89. In the outside area on stand C70, Kidde Fire Trainers will be presenting the new Mobile FireTrainer ML-2000. Due to a site extension with extended space,

this mobile unit allows fire fighters to get a very realistic feeling within the training area. The trainer will include two burn rooms, a roof entry and different fire places such as Stair Case, Flash Over and a Multi Prop Fire Place. The fires will be fully computer controlled and are equipped with agent detection sensors. KFT will also present the Outdoor Fires Series O-100 and P-100.

LION APPAREL



HALL 3, BOOTH D62

Lion Apparel is the global leader in the manufacture and supply of firefighter PPE.

As such, Lion has the benefit of applying the combined research and knowledge of its varied business divisions and international fire service customers, to provide tailored and customised solutions. These solutions are specifically designed to meet the standards requirements, climatic conditions, and firefighting procedures within each of its countries worldwide.

At Interschutz 2010 we are proud to demonstrate a number of recently developed innovative products, many of which are patent-protected.

Added to our already superior and market leading range are:

- Cooling Suspenders to significantly reduce Heat-Stress
- A Coverall in the successful V-Force® product design with only a two-layer construction, to achieve the highest breathability, combined with maximum thermal insulation performance
- High-Visibility V-Force®-Outerwear with an integrated Rescue-Loop
- Stationwear with elastic waistbands for added comfort.

Foremost in Lion's ongoing research and development activities are the following objectives:

- Improved, measurable, firefighter protection
- Reduced physiological stress and stamina requirements on the firefighter

- Added comfort and end-user convenience features
- Improved longevity features and designs providing longer garment life and reduced costs for the fire departments.

Often, the science behind such developments and the potential benefits may not be obvious to the casual inspection, so we invite you visit our Booth D62 in Hall 3 to talk to our specialists to gain a detailed understanding of these design features.

OSHKOSH CORPORATION



RESPOND FULL FORCE

HALL 2, STAND F03

Oshkosh Corporation is a leading designer, manufacturer and marketer of a broad range of specialty access equipment, commercial, fire & emergency and military vehicles and vehicle bodies. Oshkosh Corporation manufactures, distributes and services products under the brands of Oshkosh®, JLG®, Pierce®, McNeilus®, Medtec®, Jerr-Dan®, Oshkosh Specialty Vehicles, Frontline™, SMIT™, CON-E-CO®, London® and IMT®. The Oshkosh brands are valued worldwide in businesses where high quality, superior performance, rugged reliability and long-term value are paramount.

For more information, log on to www.oshkoshcorporation.com. Or visit us at our booth at Interschutz Hall 2 Stand F03

PACKEXE



HALL 2, STAND G58

Packexe SMASH, a new innovation in time critical glass management, secures glass for

controlled vehicle extrication. The self adhesive film holds glass in place upon shattering, protecting both the casualty and rescue teams from further injury caused by glass fragments and dust. Packexe SMASH is designed to work with and complement the current procedures used by brigades.

Test results show that the strength of glass is almost doubled with the application of Packexe SMASH, reducing the risk of breakage by approximately 42%. By reinforcing the glass, Packexe has eliminated the need to always forcibly break and remove glass. Upon applying Packexe SMASH to all glass deemed as a risk, the glass becomes managed. Glass can stay in situ while using cutting tools, should the glass break under pressure Packexe SMASH will hold it in place. As glass fragments are bonded in one piece with Packexe SMASH, glass can be easily removed and disposed of. Packexe SMASH can be applied in seconds by just one person; providing control and speed. The system is currently the subject of a patent application. Double foam rollers bring the film into direct contact with the glass, for smooth coverage and allowing Packexe

SMASH to perform equally well in windy conditions. The rollers push water from the surface as the film is applied in wet weather.

Since launching only 8 months ago, Packexe SMASH is now under evaluation with over 30% of the UK's Fire and Rescue Service, with a number already using it operationally.

Packexe SMASH can be seen on stand G58, Hall 2 at Interschutz, 7-12 June 2010 (Leipzig Exhibition Center, Germany), live demonstrations will also be taking place throughout the week.

PARATECH

PARATECH.

HALL 2, STAND F58

At the start of a new decade and after close to fifty years, Paratech Incorporated, an ISO

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with AC-motor.
Best version for limited storing space.



Russwurm Ventilatoren

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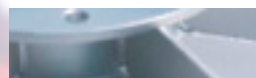
Experienced in strongest fire and rescue situations. Used in vehicles which have to be equipped for all incidents. For every duty the right drive.

All versions are available with certified explosion-proofness. We offer a wide range of ATEX-certified fans for the zones 1, 2, 21 and 22 in axial and radial design.

If required, they can be customized to your needs.



Get in contact with us and assure yourself of our capabilities.



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9001 certified U.S. manufacturer, continues to be the leader in the design and production of lifesaving, state-of-the-art emergency, tactical and industrial equipment.

Paratech's equipment has become the standard for disaster agencies' rescue teams and technical rescue caches both in the U.S. and internationally and has been called upon to assist in all major natural and human caused disasters throughout the world.

Paratech's product lines are comprised of:

Rescue Support Systems – Applications include: Structural Collapse, Excavation Containment, Vehicle Stabilization, High Angle, Confined Space and Trench Rescue scenarios.

MAXIFORCE® Air Lifting Bags – A complete system comprised of 25 different sizes of Air Lifting Bags with the power to lift or shift up to 70 tons.

Powered Impact Tools – Have the ability to break and cut through concrete, masonry walls, steel, metal and composites, aircraft fuselages and digging during tunneling operations.

Forcible Entry Tools and Tactical Forcible Entry Tools – Designed to pry, pound, puncture, twist, cut open or remove all types of barriers between emergency personnel and the life they are saving.

Firefighting Tools – Available in a range of sizes and configurations with lengths of 3' to 12' and custom lengths by special order.

Rescue Air Cushions – Available in 4 sizes and 2 pressure ranges.

Leak Sealing Systems – Specialized inflatables and plugs that are designed to shut down liquid leaks and successfully seal chemical leaks.

Special Mission Tender/SMT™ for Urban Search & Rescue and Trench – Organized, low maintenance and cost effective trailer comes fully loaded with Rescue Struts, Maxiforce® Air Lifting Bags, Forcible Entry Tools and other kits and components to facilitate rapid response to rescue scenarios.

Thanks to their instinct for innovation, cutting edge technology and excellent customer service, Paratech will continue to lead the world in the design and production of innovative lifesaving emergency equipment.

For more information on how Paratech

can help you lift, shift, seal, stabilize and penetrate...contact them at 1-800-435-9358 or visit their website at www.paratech.com

PBI PERFORMANCE PRODUCTS, INC.



HALL 3, BOOTH E71

PBI Performance Products, Inc. is producing and marketing the high performance fiber PBI® and the PBI polymer Celazole®.

PBI® is an organic high performance fiber and was originally developed by Celanese for the NASA Apollo space program because of its inherent flame resistance properties and chemical stability. Since 1983, PBI has been widely recognized as the premium product in outer shell and hood protection for fire fighting gear and for industrial heat and arc flash protection.

PBI is presenting at Interschutz 2010 the next generation of PBI outershell for fire fighters – **PBI® Matrix**.

In addition to that PBI is introducing the new spundeyd **black PBI fiber**.

PBI Performance Products is headquartered in Charlotte, in Rock Hill, South Carolina and global sales offices in England, Germany, Spain and Hong Kong. Through people, products and perseverance, PBI's goal is to provide insight into the most demanding applications. Our engineering, sales and technical support together with a family of polymers and fibers offer the very best solutions to a variety of high tech applications.

PBI Performance Products, Inc. is a wholly owned business of The InterTech Group, Inc.®, located in Charleston, SC. InterTech Group operates a diverse, global group of companies specializing in custom engineered solutions. InterTech products can be found in a wide variety of industries and applications, including aerospace, power generation, and medical, hygiene, sporting goods, home furnishings and construction materials, among many others.

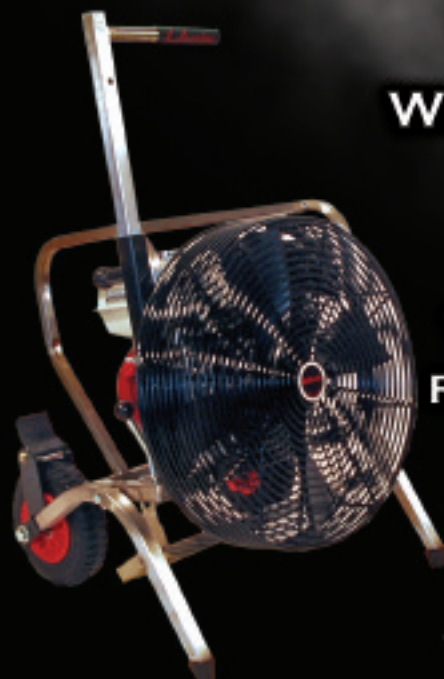
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PLASTISOL



HALL 4, B36

Plastisol will give a challenging impression of its wide product range at Interschutz 2010.

First of all the Avenger airport crashtender will be shown in 4x4 configuration. The successful Avenger range consists already of a 4x4 and 6x6 version and will later this year be extended with a complete new 8x8 chassis. The Avenger on the Interschutz is for a customer in Taiwan with a tank capacity of 6,000 litres of water and 720 litres of foam.

As a world première Plastisol presents a complete new AirTransportable crashtender. With its compact design this crashtender can be transported in a Hercules C130 airplane for rapid intervention. The CT010 is equipped with a 435 bhp 6 cylinder turbocharged Caterpillar engine. The light weight body in combination with the 4x4 chassis and a wheelbase of 4,78 meter give the AirTransportable a high manoeuvrability, on the road as well as offroad.

Other products to be found at the Plastisol stand are a.o. a complete fire fighting truck with a Plastisol cabin extension as well as a complete bodywork, a Tiger crashtender cabin and a TZine-S fire fighting superstructure. Furthermore an Eclipse people carrier will be shown in a 16 passenger configuration. This modular superstructure can be fitted on a chassis-cab from almost every regular commercial vehicle producer.

And yet another crashtender world première can be found at the Plastisol stand. The only thing we want to tell about it at this moment is: **The MAC is back!**

ROSENBAUER



HALL 4, D20

Integrated Solutions – Complete solutions for fire departments

At Rosenbauer, preparations for the "Interschutz" are in full swing. Covering an area

of nearly 5,000 m² (No. D20 in Hall 4 including the adjacent open air area), the technology leader will display its full range of capability and products with more than 30 exhibits from the areas of municipal fire fighting vehicles, aerals, ARFF vehicles and specialty vehicles.

The motto of this year's exhibition is "Integrated Solutions". Integrated Solutions means that Rosenbauer develops and manufactures the key components installed in the vehicle at its own works. The users can thus be confident that all the parts are optimally matched to one another and work perfectly in interaction.

Rosenbauer repeatedly underlines its clear technological leadership and will do so at the upcoming Interschutz fair as well. Now, a few weeks before the fair, we present some innovations that will be exhibited at the Interschutz – such as:

- the New AT – A Veritable Fireworks of Innovations
- the developed hybrid energy system for fire trucks
- Metz Aerials increases cage load to a hitherto-unachieved 450 kg and
- the brandnew 56-m aerial ladder for Saudi-Arabia.

So make sure to visit the fair and gain confirmation of the innovative capabilities at first hand.

The Rosenbauer Group

The Rosenbauer Group is the world's leading manufacturer of fire-fighting and disaster protection vehicles for airports and industry. Rosenbauer is a full-liner with over 1,800 employees and an extensive range of municipal fire-fighting vehicles and aerals in line with both European and US standards, a comprehensive selection of airport and industrial vehicles, the latest extinguishing systems and special fire service equipment. In 2008, the Group, which is represented in over 100 countries, generated revenues amounting to more than EUR 500 million.

For further information:
Rosenbauer International AG
Gerda Königstorfer, Company
Spokesperson/Investor Relations
Paschinger Strasse 90
4060 Leonding, Austria
Tel: +43 732 67 94-568
Fax: +43 732 67 94-89
Email: ir@rosenbauer.com
www.rosenbauer.com

SAINT-GOBAIN PERFORMANCE PLASTICS



HALL 3, H19/1

Saint-Gobain Performance Plastics will launch the ONESuit® Pro line of gas-tight chemical suits in Europe at Interschutz in Leipzig, Germany, on 7-12 June 2010. The ONESuit® Pro line includes chemical protective hazmat equipment for fire, chemical, military and industrial organizations. The suits' unique single-skin design enhances user comfort and maneuverability while providing the highest level of protection for those working in hazardous environments.

Visitors can view the EN-certified line of ONESuit® Pro gas-tight suits, which include CBRN, ET and Industrial versions, at the Saint-Gobain booth H19/1, Hall 3.

Saint-Gobain Performance Plastics (SGPPL) is a subsidiary of Saint-Gobain, one of the top 100 industrial companies. Saint-Gobain, the world leader in the habitat and construction markets, designs, manufactures and distributes building materials, providing innovative solutions to meet growing demand for energy efficiency and for environmental protection. Saint-Gobain Performance Plastics manufactures the ONESuit® line of chemical protective "hazmat" products and other high performance protective equipment such as gloves and chemical protective shelters.

For more information visit
www.onesuittec.com or contact Ian
Hutcheson at +353 1 8420 838 or
onesuit-emea@saint-gobain.com

SCOTT HEALTH & SAFETY



HALL 3, STAND C62

Scott Health & Safety will be on Stand C62, Hall 3 at Interschutz 2010 showcasing its

very latest designs in self-contained breathing apparatus, supplied air and air-purifying respirators and personal protective equipment.

At Interschutz 2010 Scott Health & Safety will unveil its modular telemetry system, which will include digital pressure gauge, PASS, and computer-based system plus Tally board. Scott Health & Safety will also launch its new lightweight ACS system which now features a quick release cylinder connection. Other new products on the stand will include the Vision AMS facemask and Scott's new gas detection system Protégé. Stand C62 will also feature gas detection instruments and thermal imaging cameras. The Scott Health & Safety team will be talking to fire and rescue services about how its trust and partnership approach can help to ensure total emergency worker safety.

Sponsor of the Toughest Fire-Fighter Alive Contest, Scott Health & Safety manufactures innovative respiratory and other PPE and safety devices for emergency services, industrial workers, military and civil defence organisations around the world. Scott products provide protection from environmental hazards including smoke, toxic fumes, combustible gases, falling objects, and flame contaminants. Scott has a reputation for providing specialist training, support and technical advice that has earned worldwide trust.

FRIEDRICH SEIZ GMBH



HALL 3, BOOTH D71



Helping hands are exposed to danger. This is why hands deserve the best protection. SEIZ gloves provide this. For more than 40 years, we have been developing and manufacturing gloves that combine superior safety with high sensitivity, allowing the hand to be a mobile and precise instrument even when faced with extreme situations.

Contact: Mr. Enrique Lanz

SIDES



HALL 5, STAND B89

SIDES launches a new range of fire fighting vehicles for Airports. These vehicles are designed to increase security and simplify maintenance for users.

SIDES counts many customers in the Public sector in France, including those in charge of protecting military and civil installations.

The S3X was designed in partnership with MAN. The vehicle has a modular design and was created with standardized components. In addition to the chassis and body specifications, other innovation has been incorporated in the design of the tank and foam making system.

The cab offers greater safety, improved ergonomics and aesthetics. The shape of the cab and an outside mirror set in front of the vehicle offers fire fighters increased visibility.

The S3X has a new dashboard that allows for right or left hand drive and an up-to-date machine interface programmed to the highest expectations of firemen.

It can carry from 9,100 to 10,000 litres for the airports with larger requirements.

The concept allows to adapt each unit in order to make it fit specific requirements.

SIMULATION INTERNATIONAL LIMITED



STAND H16 HALL 5

Simulation International Limited is the leading specialists in the design, supply and installation, commissioning and maintenance of live fire training simulators.

Simulation supply to: Civil Airports, Maritime industry, local authorities/civil defence, military, industry and international training schools.

We have the ability to supply the products and turnkey solutions as well as the expertise to provide consultation, feasibility and design planning at the initial stage of any fire training/product or facility.

Simulation offer a bespoke design service to meet any of our customers' needs, if you require any further information please visit our website www.simulation.uk.com or alternatively contact us via email at info@simulation.uk.com.

SOLBERG



HALL 5, STAND F29

Solberg Scandinavian, "The Foam Experts", are renowned for their forward thinking and active Research and Development program. They pride themselves on being at the forefront of new, state-of-the-art technology and indeed are proud to be able to offer our customers the very latest in PFC free Foams.

We are now pleased to be able to add two new innovative products.



INTERSCHUTZ

DER ROTE HAHN

INTERNATIONAL EXHIBITION FOR RESCUE, FIRE
PREVENTION, DISASTER RELIEF, SAFETY, SECURITY
LEIPZIG 7 - 12 JUNE 2010

SEE YOU IN HALL 4, STAND D78!

Airport Gdansk goes for ZIEGLER Z8 due to safety and quality reasons



The successful story of ZIEGLER's Z8 goes on.

Gdansk is the first airport in Poland to operate a ZIEGLER 8x8 airport crash tender with snozzle combined with a considerable amount of water, foam and dry chemical extinguishing agents.



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Customers have told us that there is a need for a multi-purpose foam for use on both Class 'A' and Class 'B' fires. Solberg Scandinavian's R&D team got to work and has developed an addition to its PFC Free foam range, which we have called 'Re-Healing Foam MB'.

The benefits and characteristics of this new foam is that it can be used at 0.5% on Class 'A' fires, and 3% on Class 'B' hydrocarbon fires, including Bio-Fuels from E5 right up to E85. This pseudoplastic foam concentrate can be used with most of the existing proportioning systems and it can be used at low, medium or high expansion (800:1). A further benefit to this new product is its ability to adhere to vertical surfaces creating a thermal barrier from radiated heat and allowing constant cooling as water ebbs from the foam bubble structure. This new feature gives fire fighters the opportunity to seal surrounding risks while they extinguish the main fire.

Sealing and controlling ammonia spills is extremely difficult due to the constant boiling of the ammonia at ambient temperatures destroying a conventional foam blanket. It requires a new product to secure and prevent any further escalation. Solberg Scandinavian is pleased to be able to announce a new state-of-the-art foam concentrate designed specifically to resolve this issue. It is an addition to the PFC Free range of foams and is called 'Re-Healing Foam H+'.

'Re-Healing Foam H+' is specifically manufactured to deal with ammonia spills, allowing firefighters to control and secure an incident without compromising safety.

For more information on these new products and to review our current range of PFC Free foams which include Re-Healing Foams RF3 & RF6 for hydrocarbon fires, Re-Healing Foam RF3x6 ATC for polar solvent fires, Fire Brake a USDL listed Class 'A' Foam and of course our Solberg TF5X Training foam please visit us at the Interschutz Exhibition in Hall 5 Stand F29

Solberg with offices in Norway, UK and Australia is an innovative, forward thinking foam manufacturer and very aware of its environmental responsibilities. At Interschutz, this company has decided to focus 100% on their PFC free foam range.

Besides the Fire-Brake class A product, often just at forest fires and also suitable for tyre-fires they would like to inform visitors also about their PFC free Class A and B product line: Re-Healing Foam™

Within this group there are two new prod-

ucts: One ,Re-Healing Foam MB, especially designed for the municipal fire-brigades, it is suitable for extinguishing Class A fires as well as Hydrocarbon fires including bio-fuels E15 up to E95. The other new product is Re-Healing Foam H+ (+ at right top corner) which can be used to cover Ammonia-spills.

TASK FORCE TIPS



HALL 5, STAND A54

Task Force Tips, Inc. is an ISO 9001 certified, worldwide producer of high performance fire streams management and water flow delivery equipment. Providing high quality, innovative products since 1971, TFT offers a full line of fixed, selectable and automatic handheld and master stream firefighting nozzles. From its headquarters in Valparaiso, Indiana USA, Task Force Tips also provides a complete line of portable, fixed and remote control monitors and water cannons, foam injection and application equipment, and the industry's broadest line of large diameter hose hardware and water flow accessories. To see the latest in new technology and innovation visit the Task Force Tips stand A54 in Hall 5 during the Interschutz show. For additional information on the complete line of Task Force Tips equipment visit www.tft.com.

TEMPEST TECHNOLOGY



OPEN-AIR SITE (FG), STAND B51

Tempest Technology, the Leader in the Development of Innovative Emergency Ventilation Tools

Over the past 22 years, Tempest has successfully promoted the concept of PPV around the world and it has become an

accepted fire fighting technique in many countries in Europe, Asia, the Middle East and the Americas. In many countries, positive pressure ventilation is being used for aggressive fire attack using a technique called, "Positive Pressure Attack" or PPA.

Tempest has played an important role in supporting the testing and research of new positive pressure ventilation applications such as PPA. Tempest Technology offers a wide range of gasoline and electric powered blowers to meet pest blowers are available with petrol or electric motors in sizes ranging from 400mm (16") diameter to 900mm (36") diameter. Explosion proof motors are also available.

Tempest will be present their full range of products during the Interschutz exhibition and will be exhibiting with their European partner B.S. Belüftungs-GmbH.

Products on Display: Mobile Ventilation Units (MVU), Positive Pressure (PPV) Power Blowers, portable smoke blocker, Flexi-Foam foam generators, VentMaster and Multi-Cut fire rescue chainsaws and other products for fire fighters.

Further information:
TEMPEST Technology
USA – Fresno, CA 93722
B.S. Belüftungs – D-89429 Bachhagel

UNIFIRE



HALL 4, STAND A72

Swedish firefighting equipment manufacturer, Unifire AB, will be showcasing a number of new and innovative, state-of-the-art firefighting products at its booth in Hall 4, Stand A72.

Among them are Unifire's newest models of its Force™ series remote controlled, stainless steel water/foam monitors, featuring highly intelligent controls and an all-new, light-weight, single-hand-operated joystick with advanced features.

Unifire will also be showcasing its new and unique Unifire Control System™ (UCS), which networks Unifire monitors together, along with other peripheral devices such as cameras, lights, valves, flame detectors, etc.,



Unifire/Segway RMP400. Picture courtesy Copyright Segway Inc

and controls them from a central location.

Perhaps the highlight of new equipment Unifire will display is the highly anticipated PYROsmart® scanning infrared system to automatically detect and extinguish fires by controlling Unifire monitors (made in cooperation between Unifire and its partner, Orglmeister of Germany).

Unifire will also be exhibiting for the first time a new prototype mobile firefighting rover with a Force water/foam monitor mounted atop a remote-controlled Segway RMP400 robotic platform. This device allows firefighters to remotely combat fires, keeping a safe distance from potentially explosive situations.

Unifire will also be displaying its world-renowned line of firefighting nozzles, including the popular V-Nozzle™, Unifighter™, Output™ and JetSet™.

Further information about Unifire's products is available at Unifire's re-designed web site at Unifire.com

VIMPEX



HALL 2, STAND F01 AND OPEN-AIR SITE (FG), STAND A14

VimpeX & Ogura Showcase Battery Powered Rescue Tools with Live Demonstrations

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Hall 3, Stand #B76 (USA Pavilion), Booth # B7





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Those keen to learn more about these excellent cutters will be able to see the tools in action on VimpeX's booth (Hall 2, Stand F01) and also during continuous live demonstrations on their external stand (Open-air site (FG), Stand A14).

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HALL 1, STAND F05/1

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COMPANY BIO:

Since its inception, Williams Fire & Hazard Control has traveled the Gulf of Mexico, the North Atlantic, Africa, the Orient, the Pacific Rim and beyond to respond to Land and Marine fire emergencies.

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"Williams Fire & Hazard Control sought to fill an industry need for a quick and effective independent response force to quell the threat of hazardous flammable liquid fires

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HALL 3, STAND A51

Wolf Safety Lamp Company is Europe's largest manufacturer of portable intrinsically safe and explosion protected lighting, designed and manufactured in the United Kingdom for safe use worldwide in potentially explosive atmospheres and extreme environments.

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OTHER EXHIBITORS

In addition to the exhibitors mentioned in the previous pages the following companies will also be exhibiting at Interschutz:

Company	Hall	Stand
AW Hainsworth & Son	3	E23
Bauer Kompressoren	5	F05
Bavaria Egypt	5	F77
Bio-Ex	5	A54
Bullard	3	E62
BW Technologies Europe	3	F71
CMC Rescue	3	B76
Con Space Communications	3	F76/1
Dafo Brand AB	5	C33
Dafo Fomtec	5	C33
Dupont de Nemours	3	E52
EADS Deutschland	3	G62
Elkhart Brass	3	C76
Euramco Safety	5	F37
Ferrara Fire Apparatus	3	C76 & open air site FG Stand B137
Firedos	4	B61
Firetrace International	3	B76
GFT General Fire Tech	5	E87 & open air site FG Stand C82
Godiva Ltd	2	B26
Groupe Leader	5	A54
Haagen Fire Training Products	5	F20 & open air site FG Stand B69
Haix Schuhe	3	A76 & A77
Honeywell International	3	A07

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Pic 1 courtesy of Mark van der Feyst



By Mark van der Feyst

Back to The Basics: Nozzle Management

With the advent of the pistol grip nozzle, came poor and sloppy nozzle handling skills.

Everybody became a cowboy or a six shooter by holding the nozzle by their hip to direct the stream of water (picture 1). I have seen everybody from the new recruit to the seasoned veteran hold a pistol grip nozzle in this fashion. The nozzle with no pistol grip, offers the same water delivery method as the pistol grip does. The pistol grip nozzle was designed to make holding a nozzle easier by one person, but one person should never be operating a nozzle by themselves. The pistol grip nozzle is a good nozzle and offers many advantages. We have forgotten the basics of handling a nozzle correctly and efficiently because of the pistol grip handle being provided. If we stick to the basics of firefighting or in this case, holding and operating a nozzle correctly, we will maximize our efforts in fire suppression.

Handling a hose line requires at least two people. The reactionary forces produced by the movement of water exiting the nozzle works against the person who is handling it. This is why we always want to have at least two people handling a hose line. As depicted in photo 1, the natural tendency is to hold the nozzle by its pistol grip handle to operate the nozzle. Look at how close the nozzle is to the firefighter's body. This firefighter will not have the ability to move the nozzle around to be effective. In order for him to move the nozzle up, down, left or right, he will have to move his whole body. Chances are the nozzle man is probably taking all the nozzle reaction because the backup man is not doing his job. This increases the ineffectiveness of handling or directing the nozzle up, down, left or right. The

NOZZLE MANAGEMENT

Pic 2 courtesy of Mark van der Feyst



firefighter will have to move his whole body as well as control the nozzle reaction by holding the nozzle close to his body.

Nozzle reaction is present with any type of nozzle being used. The amount of nozzle reaction being produced will depend upon the amount of water flowing. The more water and pressure being pumped, the greater the nozzle reaction. A single person cannot sustain holding a nozzle for a long

management. Look at the nozzle in relation to the firefighter. The nozzle is about an arm's length away from the firefighter. When his arm is fully extended, it should be able to grip the bale of the nozzle in the closed position. With the nozzle in this position, the firefighter will be able to direct the stream of water in any direction he wishes to do so. To move the stream up, down, left or right, will be a simple matter of just moving the nozzle

Nozzle reaction is present with any type of nozzle being used. The amount of nozzle reaction being produced will depend upon the amount of water flowing.

period of time without having fatigue settle in quickly due to the reactionary forces fighting against them. This is where the backup man comes into play. He has an important job to do, and that job is to take away the nozzle reaction from off the nozzle man. By doing this, the nozzle man will have the ability and freedom to control and direct the nozzle.

So how do we accomplish this? We accomplish proper nozzle management by going back to the basics. Whether you have a pistol grip nozzle or just a plain nozzle, going back to the basics can be accomplished and will work every time. In picture 2, we can see the foundation of proper nozzle

and not his whole body. Once the nozzle is open, the hand of the left arm can move onto the hose just behind the coupling to aid in the control of directing the nozzle.

Next notice the hose in the arms of the first firefighter. The hose is right up under his armpit and close to his body. His right hand is on the hose holding the hose close to his body. He is resting his right arm on his right leg to help ease the burden of holding the hose line. This will maximize and extend the duration of handling the hose line. From this position, the firefighter will be able to flow water, direct it in any direction and advance it when needed. With the nozzle out in front of the

Pic 3 courtesy of Mark van der Feyst



firefighter as shown in picture 2, the firefighter will be able to hold onto the hose when the hose line is being pulled out. If the firefighter in picture 1 is holding the nozzle by its pistol grip handle and the hose line is being pulled out by his crew who is zealous to get the hose line out, he will lose the nozzle. If he is holding the nozzle as in picture 2, and the same zealous crew was pulling the hose line out, he will have a chance to hold onto the nozzle and not lose it, another point for safety. Advancing a hose line from this position is easier and more effective and is another topic for discussion.

The backup man in picture 2 has an important job. His job is to support the nozzle man. We teach new recruits to support the nozzle man by putting their one arm on their back and their one foot behind the nozzle man's foot as per the IFSTA Essentials Book. What does this do? It makes the picture look pretty, but is accomplishing absolutely nothing. In picture 2, look at the backup man's position in relation to the nozzle man. He has his whole body supporting the nozzle man and has both hands holding the hose. By doing this, he is taking away the nozzle reaction from the nozzle man, and at the same time, is supporting the nozzle man. (When it comes time to discuss hose line advancement, this position is very crucial in the drive of the hose line.) The backup man has to ensure that hose remains in a straight line. By keeping the hose in a straight line, the backup man is ensuring the nozzle reaction stays with

him. This will give the nozzle man the ability to direct the nozzle. Once the hose line is not kept straight, the nozzle reaction is transferred back to the nozzle man. This is crucial when the nozzle man is directing the stream left, right, up or down. Whichever direction the nozzle man decides to move the nozzle, the backup man has to synchronize his movements with him to maintain that straightness in the hose line. Notice how straight the hose line is in picture 3.

So far we have shown pictures with a 1½" handline. This size of handline is easier to handle versus a 2½" handline. The techniques discussed above also work for the 2½" handline. In picture 3, a different technique is being used from the backup man to support the nozzleman. By facing backward and putting his whole back against the nozzleman, the backup man is able to support the nozzleman, extend his endurance in holding the hose line and will be able to keep watch on the conditions behind them at all times. Another technique for the 2½" handline, is for the nozzleman to put his one knee on the hose (using his whole body weight) while keeping the same amount of hose in front of him. This aids in one man having to flow a 2½" handline by themselves for a short duration of time while waiting for his partner.

By going back to the basics with our nozzle management, we will produce a better trained firefighter who will be more effective in fire stream application.

IFF

Mark van der Feyst is an 11 year veteran of the fire service. He currently works for the City of Woodstock Fire Department. Mark is an international instructor teaching in Canada, India and the United States. He is a Local Level Suppression Instructor for the Pennsylvania State Fire Academy, an Instructor for the Justice Institute of BC and a Professor of Fire Science for Lambton College. He can be contacted at Mark@FireStarTraining.com



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Vapour Suppression With Class B Foams*

By Ted H. Schaefer[∞], Bogdan Z. Dlugogorski* and Eric M. Kennedy*

Process Safety and Environment Protection Research Group

*The University of Newcastle, Callaghan, NSW 2308, Australia
Tel: +61 2 4921-6176
Fax: +61 2 4921-6920
Email: Bogdan.Dlugogorski@newcastle.edu.au

[∞]Solberg Asia Pacific Pty Ltd, St. Marys NSW 2740, Australia
Tel: +61 2 9673-5300
Email: ted@solbergfoams.com

In an emergency scenario, most non-ignited flammable liquid spills are covered with AFFF foam to prevent ignition. Pressure has been mounting from some environmental agencies not to allow the use of fluorosurfactant based fire fighting foams in this situation, or only allow the use of these foams when there is risk to human life or health. Suppressing a non-ignited flammable liquid spill with an AFFF by the responding agency may result in an action or a fine from a local environmental agency. Are there any fluorochemical free foams that are capable of suppressing vapours of flammable liquid spills?

Vapour suppression with Class B fire fighting foams

As reported by Winder et al.,¹ 47% of all incidents with hazardous materials in Australia involved flammable liquids. Once a fire involving flammable liquids occurs, fire fighting foam is normally applied to extinguish the fire. However, in the situation of a non-ignited flammable liquid spill or a post fire scenario, fire fighting foams are also used for vapour suppression operations to confine the release of a chemical. Significant vapour suppression of hydrocarbons, such as heptane, have been reported to be in excess of 60 min as measured in a closed chamber, or a flux chamber, by using an aqueous film forming foam (AFFF) solution.^{2,3}

AFFF technology uses fluorosurfactants, which gave foam the characteristics of rapid movement on fuels, foam fluidity, self healing, and unrivalled fire mitigation performance. The subsequent formulations of AFFF, which were developed, contained mixtures of fluoro and hydrocarbon surfactants. The fluorosurfactants had characteristics of high temperature resistance, chemical inertness, and created a low surface tension at an air – solution interface.

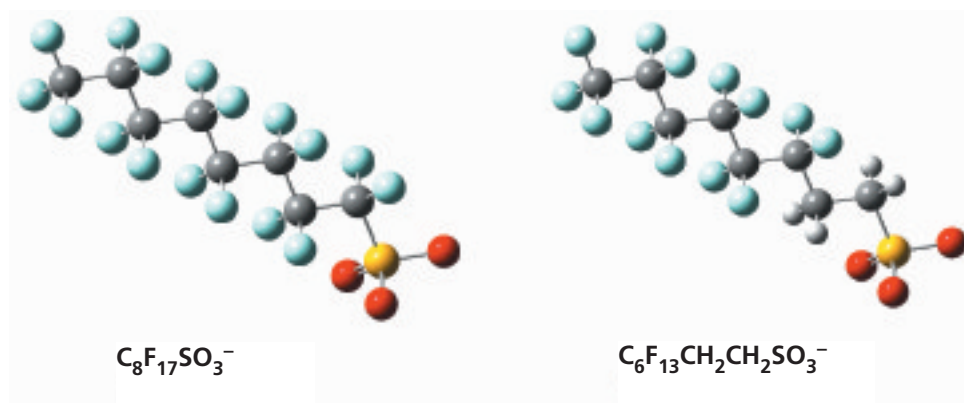
The hydrocarbon surfactants assisted with the generation of the foam structure.⁴

As a consequence, new foams were developed through the 1970s, which included AFFF – alcohol resistant foams (AFFF-ARF), film forming fluoroprotein foams (FFFP) and their alcohol resistant version (FFFP-AR). As a result, all Class B foams contained fluorosurfactants. Table 1 summarises the foam technologies and their base chemistry. The fluorosurfactants display a unique structure that involves a combination of perfluorinated and hydrocarbon segments. The result is a surface active agent that has a water soluble end (hydrophilic) and a perfluorinated end that has a non-water soluble (hydrophobic) end. In addition to repelling water, the hydrophobic part of the fluorinated surfactant also repels hydrocarbon liquids and oils; that is, it possesses the lipophobic properties. In effect, the perfluorinated end positions itself in the air phase within a three-phase air-water-oil system.^{5,6}

Manufacturers of fluorosurfactants currently use

*This contribution is based on a paper presented at the 7th Asia-Oceania Symposium on Fire Science and Technology, Hong Kong, 2007.

Figure 1. Structures of two fluorosurfactants, a simple PFOS and 6:2 fluorotelomer, positioned for direct comparison of molecular geometry of both anionic species¹¹



surfactants based on telomers. The most common fluorosurfactant used in Class B fire fighting foams results from the telomer process with the following formula, $\text{C}_6\text{F}_{13}\text{CH}_2\text{CH}_2\text{SO}_3^- \text{NH}_4^+$.⁷ Efforts are now underway to purify the C6 feedstock, thus minimizing C8 and PFOA related compounds under newly published US EPA guidelines. All fire fighting foam manufacturers relied on a small group of chemical companies for sourcing their fluorosurfactants.

It is the perfluorinated portion of the surfactant molecule that equips surfactants with their unique

To study vapour suppression in a laboratory environment it is necessary to construct a small chamber to measure the VOC that fluxes through the foam blanket.

surface chemistry characteristics, including chemical inertness and heat resistance. The heat resistance of the fluorinated moiety was a desirable property for a harsh environment such as fire. The organic portions appear to biodegrade quite rapidly, leaving the perfluorinated segment of the chain as inert and non-biodegradable. Such perfluorinated segments do not occur naturally in the environment.⁶ They do not decay further by photolytic, hydrolytic or biological means, and tend to be highly persistent in the environment, with implications of potential bioaccumulation.⁸ Recent study by the Norwegian Pollution Control Authority (SFT) determined that organisms such as earth worms and sea snails were found to have bio-accumulated C6 fluorochemicals and related

by-products in areas that used C6 fluorotelomer based AFFF products.⁹

In the UK, Harman¹⁰ identified environmental concerns relating to the use of fire fighting training grounds, and indeed fire scenes, namely: (i) the hydrocarbon fuel; (ii) the biological oxygen demand (BOD) potential of the foam; and (iii) and any residual materials such as the organohalides, including fluorochemicals.

Klein^{11,12} has put forth an argument that the structural differences between a simple PFOS molecule such as $\text{C}_8\text{F}_{17}\text{SO}_3\text{K}$, and 6:2 fluorotelomer ($\text{C}_6\text{F}_{13}\text{CH}_2\text{CH}_2\text{SO}_3^- \text{NH}_4^+$) are marginal. They have a similar length and the ends of the molecules are identical in diameter. Therefore, in biological systems that function on key-lock mechanisms due to molecular geometry, the aforementioned structures could have similar acceptance at an active site. Figure 1 illustrates the structure of the simple PFOS and the 6:2 fluorotelomer. To date, no research has been established to prove or disprove this hypothesis.

The recent years have witnessed a new chemistry of fire fighting foams that omit the environmentally persistent fluorosurfactants and fluoropolymers, relying on hydrocarbon surfactants. These foams are sometimes called FfreeF type of fire fighting foams in several regions. Some products may use of polymers to boost performance on biofuels, such as E10 and E15 petrol. By removing the persistent fluorochemicals from the formulation, the long term environmental affect of persistence is mitigated. Though, these products must be considered on the merits of both performance and reduced environmental impact.¹³

Vapour suppression study

Fire fighting foams are employed to secure vapours from spills of volatile organic compounds. The use of a flux chamber to predict the vapour suppress-

Table 1. Summary of foam technology and its chemistry.

Foam Technology	Major Components of Foam Chemistry
AFFF	fluorosurfactants + hydrocarbon surfactants
FPP	fluorosurfactants + protein
AFFF-ARF	fluorosurfactants + hydrocarbon surfactants + polymer
FFFP	fluorosurfactants + protein + hydrocarbon surfactants
FFFP-ARF	fluorosurfactants + protein + hydrocarbon surfactants + polymer
FfreeF	hydrocarbon surfactants + polymer (optional)

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ing capability of a fire fighting foam is an evaluative procedure that has been widely applied by the fire safety industry. As found in the literature,³ rules of thumb and predictive charts have evolved, allowing fire fighters to use specific types of foams effectively. For example, Pignato recommends a 15 cm blanket of 6% AFFF to suppress a n-heptane spill for 60 min.³ The question that arises from the above discussion is: Can a fluorochemical free foam be capable of suppressing VOC vapours?

To study vapour suppression in a laboratory environment it is necessary to construct a small chamber to measure the VOC that fluxes through the foam blanket. The flux chambers used in experimentation by Hardy and Purnell,¹⁴ Pignato,³ Hanuaska,¹⁵ and Carruette et al.¹⁶ were made of glass. Balfour et al.¹⁷ and Alm et al.¹⁸ made further refinement of the experimental flux chamber apparatus by employing a desiccator with a transparent lid and a high density polyethylene base. We included these design modifications in constructing a flux chamber employed in the present study. The assembled apparatus had a diameter of 250 mm, with the total volume of the desiccator calculated as 9.88 L.¹⁹

The flux chamber was plumbed to a nitrogen cylinder with nylon tubing. The nitrogen flow was continuously sweeping heptane vapour to the sampling loop. The sample automatically injected into a gas chromatograph.

Experimental results

The repeatability of the flux chamber experiments was verified with a replicate run of the FfreeF foam, Solberg Re-Healing Foam RF6 experiment having a foam expansion factor of 5.0 and a foam depth of 1.0 cm. A 10% error bar was applied to the data sets to assist in illustration of the good data fit between experiments. The expected primary causes of the observed variation are the sampling frequency and the variations in rate of foam collapse (Figure 2).

The AFFF kept the n-heptane vapour suppressed for approximately 140 min before the point of vapour break-through, while the RF6 foam, under the same conditions, held for approximately 60

min. Formulations A and B could only temporarily suppress the n-heptane vapours. Formulations A and B gave limited vapour suppression through the first 7 min, becoming ineffective beyond that time. It should be noted that Formulation B recommends its product for vapour suppression of water immiscible hydrocarbon fuels.

Conclusions

The fire fighting foams selected for this study included the foams classified as synthetic by the fire fighting industry. PFOS based AFFF was incorporated in the study to provide a base-line of traditional performance. The other synthetic foams selected were not AFFF products and did not contain fluorosurfactants. The three synthetic formulations incorporated in the present investigation included two foam concentrates (Formulations A and B), and RF6.

From the results it is obvious that not all fluoro-surfactant free foams are capable of being employed on a vapour suppression operation. The FfreeF that does appear to be capable of operational vapour suppression is the RF foam technology, of which RF6 included in this study. The AFFF FC-206CF showed the best vapour suppressing capability, however, this PFOS based product has been discontinued and is no longer available.

The common practice of vapour suppression from cold spills and from post-fire evaporation of fuel using fire fighting foam includes the reapplication of foam at 15 to 25 min intervals to maintain the foam blanket. The foam application density is normally in the range of 4.1 to 6.5 L m⁻² min⁻¹,²⁰ which is at least 10 times higher than that utilised in this study. Normally 7 cm of foam would be recommended to suppress n-heptane for approximately 20 min.³

In February 2010 a major refinery in Melbourne, Australia had an unleaded petrol spill of over 20,000 L during a storage tank failure. The local fire brigade successfully suppressed the unignited spill with Solberg Re-healing Foam Technology (RF Foam) until salvage operations were completed.

In conclusion, not all non-fluorochemical FfreeF

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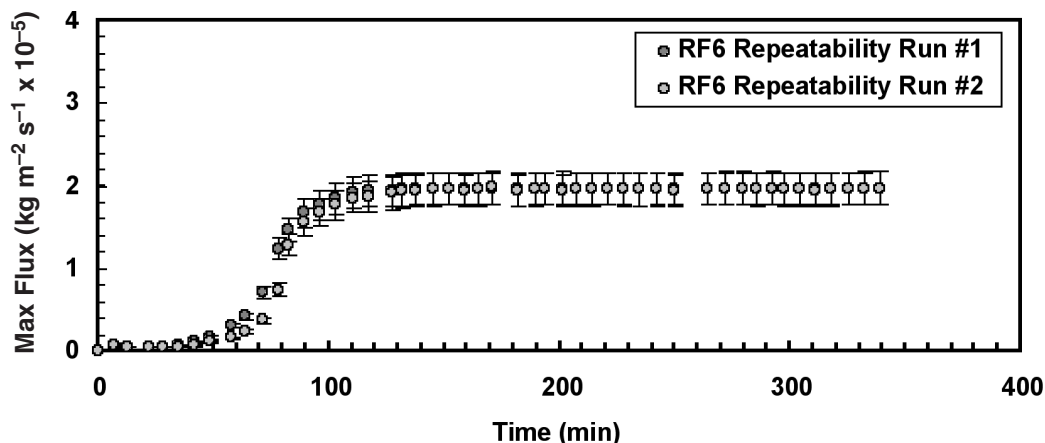


Figure 2. Repeated mass flux experiments of RF6 with 10% error bars attached to all data points

foams are effective in vapour suppression. We have identified that at least Solberg RF Foam Technology is capable of successful vapour suppression operations. FC-206CF AFFF showed its ability for longer duration vapour suppression, however, it is necessary to consider local legislation and the ability to successfully collect and destroy the AFFF due to the environmentally persistent fluorochemicals. While FfreeF foams can be successfully treated in activated sludge waste treatment plants.

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Table 2. List of fire-fighting foams used in experimentation including some physical characteristics of the concentrates.

Property	FC-206CF [3M 1999]	Solberg RF6 [SSAS 2005]	Formulation A	Formulation B
Use concentration	6%	6%	0.4%	1-3%
Technology base	AFFF	Synthetic	Synthetic	Synthetic/ bacteria
Surfactants system	Hydrocarbon/ fluorocarbon	Hydrocarbon	Hydrocarbon	Hydrocarbo and selected non-toxic/ non- pathogenic microbes

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Above all



The Importance of Fabric Performance

By Charlotte Brandt

Sales Manager,
Technical and Industrial
Textiles, Hainsworth

Regularly faced with life-threatening situations, firefighters naturally depend on a strong outer-shell fabric in their turnout gear. Reliable, durable and tough uniforms are essential and can mean the difference between life and death – it's therefore vital that they perform.

Firefighters require three-way protection from flames, smoke and heat. But whilst uniforms must protect from these intense elements, it is also important that they do not restrict movement, nor store heat close to the body. The requirement to effectively combine optimum comfort with the very best safety credentials means the performance of protective fabrics is constantly being challenged to ensure that firefighter turnout gear is as efficient and safe as it can possibly be.

There is an increased pressure for the very best heat resistant and high performance fabrics, to ensure that the risks firefighters face in critical situations, such as flashover, are minimised. The nature of a firefighter's work also requires a great deal of physical exertion, demanding flexibility and ease of movement in conditions which will of course increase body heat and perspiration; personal protective equipment must be designed to provide comfort and freedom of movement, whilst also being able to absorb moisture.

Having effective kit which meets these demands increases the effectiveness and performance of a firefighter in a high stress situation, allowing them to do their job with the precision and concentration required in potentially life-threatening scenarios.

Personal protective equipment that doesn't meet these needs can lead to increased fatigue and distraction of the wearer, to the point where the risk of occupational injury increases and quality of their work dramatically decreases. Fabric failures can also lead to serious conditions such as heat stroke, creating dangerous scenarios for individual firefighters and putting their team at risk.

Not too long ago the fire service relied on heavy woollen tunics but in recent years, firefighting uniforms have evolved to utilise revolutionary technology and design, implemented as knowledge of the risks faced by firefighters becomes increasingly well researched and documented.

Complex fabric technology has developed hugely to ensure that key performance elements



can be incorporated to produce state of the art, functional firefighter kit. As a result of careful research, investment and product understanding, textile leaders like Hainsworth have developed a comprehensive range of fabrics to facilitate continued improvements in the quality of end product turnout gear produced by manufacturers, allowing fire brigades to provide optimum quality, protection and comfort to their teams.

Kevlar® and Nomex®

The main components found in modern firefighter clothing are Kevlar® and Nomex®, both which were developed and launched by DuPont in the 1960s and were introduced to the protective garment market through a supply partnership with Hainsworth in 1975. Having already supplied traditional fabrics to fire brigades for over 100 years, Hainsworth was already a specialist in protective textile innovation and this move consolidated its dominant market share in the UK.

Kevlar® is known for its strength whilst Nomex® offers flame and heat resistance. Kevlar® is often cited as being five times stronger than steel on a filament to filament basis, therefore helping to reduce the risk of garment damage from ripping. Nomex® is renowned because it carbonises and thickens when subjected to extreme heat, creating a barrier between the fire and the garment wearer and therefore protecting from burns and heat.

DuPont now estimates that use of the two fabrics combined count for some 70% of thermal protection in a firefighter's turnout gear. But a

careful balance of these fabrics is required to ensure that they both function in the most effective and beneficial way for the wearer.

Achieving the right balance – the value of fabric strength

High tensile and tear strength usually translates into good wear life and consequent better whole life value, with garments requiring fewer repairs and lower replacement levels as a result of the mechanical failure of the outer-shell. Does it, therefore, follow that the highest fabric strength possible should be welcomed across the board?

Not necessarily!

Of course, acceptance depends on varying end user requirements that have to be determined by a PPE Assessment as required under the UK PPE at Work Regulations 1992. High strength normally comes with a higher percentage Kevlar® content in the outer-shell which can lead to a variety of other problems. Kevlar® is very strong but it is very rigid and, therefore, extremely fragile and will shatter when flexed – a process called fibrillation. This gives the characteristic frosted appearance to Nomex® Tough blends (23% Kevlar) and Pbi Gold (60% Kevlar).

This fragile nature of Kevlar® also leads to poor abrasion resistance as, rather than moving and flexing with the wearer, the yarn fibres simply break. This is especially apparent on areas of high stress such as elbows, knees and the interface with the BA set – on the shoulders in particular. Kevlar® also transmits heat more quickly than Nomex®. Thus, fabrics with a high Kevlar® content will transmit heat through to the wearer faster, especially at lower working temperatures, when compared to fabrics with a low Kevlar® content e.g. Nomex® Antistatic or Nomex® Comfort (5% Kevlar®).

Fabric strength is not static throughout the life of the garment and can be detrimentally influenced by external factors such as abrasion (through everyday wear and laundering) and UV degradation. A fabric that is initially very strong may not stay that way, so any perceived benefits of this higher strength may be lost over time.

This is one of the reasons why Hainsworth® TITAN removes the majority of Kevlar® from the face of the fabric and positions it on the back. Here, it is protected from the effects of UV degradation and abrasion, but still offers strength and integrity to the outer shell fabric.

When identifying the benefits of higher strength, we should first define strength parameters. EN469:2005 sets the tensile strength requirement of an outer-shell fabric at 450N. This translates into a fabric that cannot be torn or ripped by hand without the use of a tool e.g. knife or scissors. Most outer-shell fabrics on the market exceed this level by a considerable factor coming in at 1000N or higher, prompting the question: "Why?"

A significantly higher tensile strength will not offer better thermal performance, nor will it reduce heat stress or increase comfort. In fact, it could quite possibly have the opposite effect.

Claims for increased tensile strength can end up being about performing against a specific, intensive lab test and may not bear any relation to the requirements of real life or increased protection for

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the wearer. Focusing on strength is one small element of garment assembly and doesn't automatically make it a better performing fabric in the long run.

Protective innovation

Fabric development is moving at a fast pace. Through its innovation centre, laboratory, Thermal Protective Performance testing and fabric analysis, Hainsworth developed TI-technology™ for the PPE market in 2000, marking the start of a ground-breaking change for the protective garment industry.

Hainsworth also recognises that there are many operational risks which require specific protection, so they have developed a range of TI-technology™ solutions to meet these requirements.

TI-technology™ is revolutionary in that it makes the most appropriate use of each fibre's unique characteristics – the thermal protection and flexibility of Nomex® and the strength of Kevlar®. The revolutionary part comes through linking the two fibres; not by conventional blending but in the weaving process.

Nomex® is used on the face of the fabric with the high strength of Kevlar® protected from the effects of UV degradation and abrasion on the back, thereby creating a robust fabric that looks smarter for longer.

This produces a fabric which, under conditions of extreme heat, creates active air entrapment. The Nomex® layer consolidates, whilst the Kevlar® layer remains relatively unchanged. The different thermal shrinkage of the fibres means that the two centre

stitched layers move and react against each other. The open breathable construction reacts to form air pockets between the two layers, increasing thermal protection but crucially, only when it's needed.

The fabric system offers better thermal protection than conventional heat resistant aramid fabrics of the same weight and performs to perfection, going beyond the requirements for strength and durability but providing the end user with a garment that allows them to do their job as effectively as possible.

Hainsworth also recognises that there are many operational risks which require specific protection,

so they have developed a range of TI-technology™ solutions to meet these requirements. In addition to Hainsworth® TITAN, Hainsworth® METIS provides a lightweight option for low risk scenarios and Hainsworth® ATLAS, a heavyweight double cloth which offers the highest level of thermal protection in the range and removes the need for bulkier thermal barriers, offering a more comfortable, bulk free garment.

All the above qualities are available with REPEL+, a unique finish that offers long-lasting protection against the ingress of water and hazardous chemicals, even after repeated laundering.

This has made the Hainsworth range the fabrics of choice for firefighters worldwide, from Boston to San Francisco, Copenhagen to Madrid and Saudi Arabia to Taiwan.

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Picture 1 courtesy of author



By **Mark van der Feyst**

SCBA Training:

SCBA Low Profiling

Our SCBA is one of the most important pieces of equipment that we use on a daily basis. It protects us from IDLH atmospheres and has been considered the key in the advancement of the fire service today with regards to safety for the firefighter. All pics courtesy of Mark van der Feyst.

Our SCBA has evolved through the ages. We now have very modern looking SCBA compared to the first generation SCBA's. Under development currently is a new generation of SCBA that will eliminate one big cylinder on our back and will see a slim and flat package that will house six to eight smaller cylinders all enclosed by a hard case. The advantage is a smaller profile on our back without the exposure of entanglements. If you conduct a web search on "next generation of SCBA", you will find all the information on it.

Our SCBA does have limitations that we need to be aware of and need to know how to overcome. Our SCBA limits our vision, especially peripheral vision, limits our ability to communicate

and hear, it adds extra weight to our back to carry, limited air supply time and limited ability for moving around with ease. Our SCBA adds extra profile to our bodies that hinders our ability to move around or through obstacles. In our basic training, we have all been presented with an obstacle that requires us to somehow reduce our profile so that we can pass through. This technique called "low profiling", is now being taught in firefighter survival classes as a way of self rescue. This technique has been around well before firefighter survival training started to emerge and we need to go back to the basics of knowing our equipment and how to use it. Low profiling is one of those techniques that we should all know and practice.

SCBA

Picture 2 courtesy of author



Whenever we reduce our profile, there is an inherent risk that we are taking. We normally want to keep our SCBA on our backs at all times. From the moment we don our SCBA in the back of the apparatus, we usually want to keep it on until we come out of the structure and doff it. When we take off our SCBA or partially remove it within an IDLH atmosphere, we are increasing the risk of exposure to a potentially bad situation. Our SCBA can be lost if this technique is not executed in the proper fashion, or it can become entangled,

or we may not extend the straps all the way or we may drop the SCBA down a hole in the floor thus losing our air supply. All of these listed risks need to be eliminated or managed in such a way so that we reduce the chance of a potentially bad situation. The only way to manage these risks is to become familiar with low profiling so that we are proficient with this execution.

There are three ways in which we can reduce our profile. The first way is to simply loosen the straps of the SCBA, but keep the SCBA on. By

Picture 3 courtesy of author





Picture 4 courtesy of author

loosening all of the straps (waist strap and shoulder straps) we are allowing the SCBA to move freely on our back. By doing so, we can navigate through any smaller size opening allowing the SCBA to either move to one side or the other. Once we pass through the opening, we can then retighten the straps and carry on. In a survival instance, retightening the straps is not that important, as we want to exit the structure as fast as we can. In a search operation, it will be prudent for you to retighten the straps thus ensuring that the SCBA will stay on your back. If the straps are not retightened, they can become an entanglement hazard as well as allow the SCBA to fall off. This will slow you down and make you become ineffective.

We need to make sure that we are extending the straps all the way open. A lot of firefighters will only loosen the straps a little. This will still allow you to take off your SCBA or move it to one side, but when it comes time to put the SCBA back on, you will have trouble. You need to remember that while you are wearing structural firefighting gloves, you will lose some of your dexterity and feel. This will slow you down when trying to put the SCBA back on. If the straps are extended all the way open, you will be ensuring a quicker and easier time re-donning your SCBA. By having the straps extended all the way open, you are in a sense opening the door wide open to allow you to put your arms through them with ease. With the straps only partially extended, the door is only half open.

The second method involves

loosening the straps and taking only one side of the SCBA off. Look at picture 9. Here the firefighter has moved his SCBA to one side of his body. This profile will allow the firefighter to fit through tighter obstacles. Depending upon the size of the firefighter to begin with, this may be the preferred method of reducing your profile. This technique requires all straps to be loosened, and then removing one shoulder strap from your body. The shoulder strap that contains your regulator needs to stay on your body. This will protect the regulator from being pulled apart from the face piece. With different manufacturers of SCBA, it is important to

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Picture 5 courtesy of author



know which side the regulator is on with your specific brand of SCBA. In picture 9, we can see the firefighter protecting his regulator by having the left shoulder strap still on his body. Once the SCBA is on the side of your body, you will be able to maneuver through and bring the SCBA along with you. Once through the obstacle, you will be able to don the SCBA. It is important to sound the floor when you are going through any type of an obstacle. You need to make sure that a floor exists to sustain your weight.

The third method is the more risky method which involves removing your SCBA completely and passing it through the obstacle in front of you, then re-don the SCBA afterwards. As mentioned before, the straps will need to be fully extended before you remove your SCBA. In picture 1, the firefighter has an opening only 14" x 14" to go through. He has used his tool to sound the

floor on the other side of the wall. He now knows that there is a floor complete with no holes in the immediate vicinity. This is important to check because as you pass your SCBA through the opening, if there is a hole in the floor that you missed, your SCBA will go for a ride and so will your face piece and regulator. In picture 2, the firefighter is now preparing to remove his SCBA. He is extending his straps fully. In picture 3, the firefighter now has his SCBA off his back. He is wearing an MSA SCBA and he is going to be protecting his regulator by holding onto the right shoulder strap. In picture 4, the firefighter is now passing his SCBA through the opening.

In picture 5, we can see from the other side of the wall, how his SCBA is being passed through. He has a firm grip on his right shoulder strap so as to protect his regulator and also to make sure that he does not lose his SCBA. The firefighter also

Picture 6 courtesy of author





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SCBA

Picture 7 courtesy of author



passed his SCBA through the opening with the bottom of the cylinder going through first. By passing the SCBA through the opening with the bottom end first as opposed to the top end going through first, allows the firefighter to have more length of low pressure hose for his regulator. If the top end goes through first, it will decrease the length of low pressure hose feeding the regulator.

Notice the tool lying right next to the wall. This is done so that when the firefighter is ready to move on, he can easily locate the tool. Many times, we will throw our tool through the opening and let

it land where it falls. This is not what you want to do. This will only allow you to lose your tool and create more of a panic. By placing the hand tool by the edge of the wall at the bottom, it will be easy for the firefighter to locate it after he has donned his SCBA. All he has to do is feel the wall down to the bottom and then fell along the bottom.

In picture 10, we can see another example of an SCBA being passed through an opening. This firefighter does not have a firm grip on his SCBA. He is holding it with both hands on the side of it pushing it in front of him. Is he sounding the floor,

Picture 8 courtesy of author





Picture 9 courtesy of author

are there any holes in front of him? If there are, his SCBA will definitely fall through the opening with no chance of him stopping it. Be sure you have a firm grip on the shoulder strap that contains the regulator. In pictures 6 and 7, we can see the firefighter making his way through the opening. Once through, he is now going to re-don his SCBA as seen in picture 8.

The opening that he went through was only

14" × 14". This is a typical opening seeing as stud walls are spaced 16" on center allowing a 14" opening between the studs. A good drill is to make this size hole and make everyone go through it at least once. You will be surprised that even the biggest person on your dept will fit through using certain techniques such as low profiling. It is also a good confidence builder for each person.

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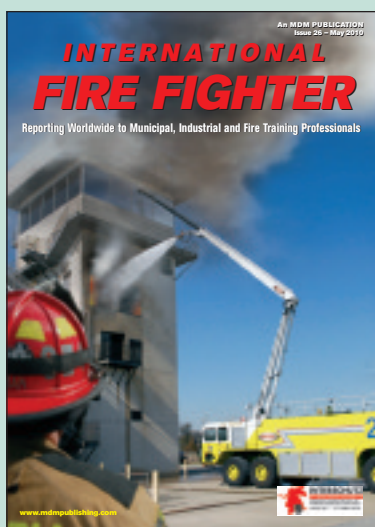
Picture 10 courtesy of author

Mark van der Feyst is an 11 year veteran of the fire service. He currently works for the City of Woodstock Fire Department. Mark is an international instructor teaching in Canada, India and the United States. He is a Local Level Suppression Instructor for the Pennsylvania State Fire Academy, an Instructor for the Justice Institute of BC and a Professor of Fire Science for Lambton College. He can be contacted at Mark@FireStarTraining.com

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Anti-Fire Co., Ltd.
Phone: 6622998899
Fax: 6622582422
sitichai@antifire.com
www.antifire.com



BRAZIL
L. Tech
Phone: 55 51 3061 0030
Fax: 55 51 3061 0040
ltech@ltech.com.br
www.ltech.com.br



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Fax: 783125332617
tkhmirov_n@yahoo.com



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Fax: +603 8023-5618
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nazam.seoud@heba-fire.com
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lvargas@tycointl.com



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office@skfire.com
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E-mail: ian.callaghan@pbipproducts.com

Im Gewerbepark D23 // D-93059 Regensburg, Germany
T +49 (0) 941 465 275 9-9 // F +49 (0) 941 465 275 9-8
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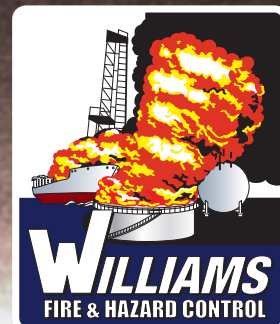
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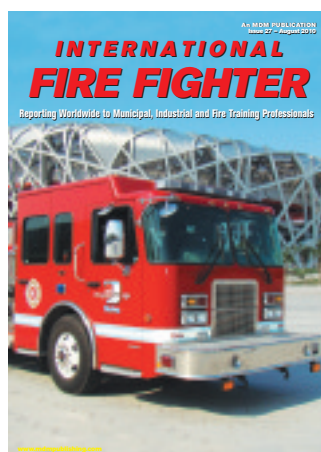


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August 2010 Issue 27



Cover picture courtesy of WS Darley Inc. Darley CAFS Pumpers were selected by the Beijing Fire Service for protection during the 2008 Olympics. The Beijing Fire Service, have just placed an order for 22 more which are due for delivery in 2010.

Publishers

David Staddon & Mark Seton

Sales Manager

Mark Bathard

Group Editor

Graham Collins

Contributing Editors

James Humpoletz, Mark van der Feyst, Graham Collins, Duncan White, Suzie Izzard, Luc Jacobs, Andrew Shiner, Greg Richardson, Lori Peace

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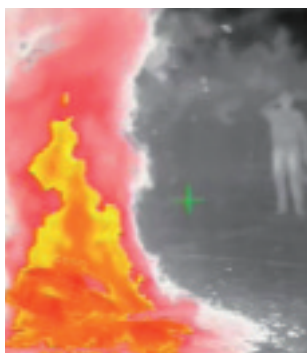
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By Graham Collins

Endless Challenge

As we go to press with this latest edition of *International Fire Fighter*, our television screens are once again filled with the depressing images of massive tracks of the world being devastated by fire and natural disasters.

Wildfires engulfing 200,000 hectares of central Russia have, despite the efforts of what we are told is approaching 155,000 firefighters, soldiers and volunteers, already claimed scores of lives. These fires, which are affecting several regions of the country, are also impacting on the cost and availability of the world's food stocks as vast wheat fields are destroyed, pushing up global prices of flour-related products such as bread. Ironically, the Russian wildfires come at a time when a Royal Commission has just completed its final report on the bushfires in Victoria, Australia that in 2009 destroyed 450,000 hectares of the State and killed nearly 200 people.

innovations, training issues, experiences and knowledge gained at the sharp end.

As the recent disaster at the Love Festival in Germany so clearly showed, open-air festivals have the potential to be anything but easy-going, carefree events. So significantly, in this issue we learn how the fire and rescue service achieved a zero incident event at this year's Glastonbury Festival in the UK, the largest green-field music and performing arts festival in the world.

In this issue, we are also looking at the latest developments in thermal imaging, structural collapse and confined space rescue, reflecting the challenges faced in the aftermath of many natural disasters. We also review the latest hydraulic

International Fire Fighter continues with every edition to endeavour, through its pages, to keep professional firefighters around the world up to date on new and emerging firefighting techniques, equipment innovations, training issues, experiences and knowledge gained at the sharp end

At the same time, the people of Haiti are still suffering from the aftermath of the earthquake in January that killed between 217,000 and 230,000 people, injured an estimated 300,000, and left around 1,000,000 homeless. And now we have flooding affecting a vast tract of Pakistan, where rescue service officials are reported to be anticipating that the death toll may be as high as 3,000.

Some of these tragic events are either partially or totally beyond our ability to anticipate or control, while others bear the menacing trademark of the careless or malicious hand of man. Either way, it is to the professional firefighter and rescuer that we all turn to in such troubled times, and place an almost unbearably heavy burden. Their resilience, courage, skill and resourcefulness frequently almost beggars belief.

It is with this in mind that *International Fire Fighter* continues with every edition to endeavour, through its pages, to keep professional firefighters around the world up to date on new and emerging firefighting techniques, equipment

rescue tools unveiled by some of the leading manufacturers at the recent Interschutz fire and rescue exhibition in Germany, and take a close look at the latest thinking on foam concentrates and the latest developments in fire pump technology. There is also a timely article about the need for safety checks on self-contained breathing apparatus.

Fire chooses its own place, and its own time. So, no doubt, by the time the next edition of *International Fire Fighter* comes around new – and who knows, possibly more demanding – emergencies will be being tackled. This places a very high premium on experience, and the value of sharing this experienced with other firefighters around the world cannot ever be over estimated. It is an endless challenge; one in which *International Fire Fighter* has a role to play. Which is why we are always keen to learn about innovative solutions to new or old problems and share the knowledge through timely articles in the pages of the magazine.

IFF

Shanghai Airport's new strikers

Shanghai Hongqiao International Airport in China has taken delivery of two OSHKOSH® Striker® 3000 aircraft rescue and firefighting vehicles. Following earlier orders from Pudong International Airport, it means there are now six Oshkosh Striker vehicles in the region.

The Oshkosh Striker 3000 offers a 6x6 all-wheel-drive axle configuration and proprietary technologies such as TAK-4® independent suspension, triple-agent firefighting capabilities and Command Zone™ advanced electronics for enhanced manoeuvrability, firefighting power and reliability. Other features include a 3,000-gallon (11,356-litre) water capacity, 420-gallon (1590-litre) foam capacity, roof turret and six under-truck nozzles.

Hongqiao International Airport is the first civilian airport in Shanghai and, following a series of renovations, it has become one of the three international air



transit centres in China. Ninety-one airlines currently operate between the airport and other domestic and international cities. The airport's Terminal Two was opened earlier this year and a new 3.3 kilometre long runway is capable of supporting large

aircraft, including the Airbus A380.

**For more information,
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New gas-tight suits ensure protection and comfort

Personnel working in dangerous environments now have a new option for limited-life chemical-protective gas-tight suits with SAINT-GOBAIN PERFORMANCE PLASTICS' ONESuit® Pro. With a single-skin design, ONESuit Pro hazmat suits offer fire, chemical, military and industrial organisations certified protection against chemical and biological agents, coupled with significant wearer comfort. Customised versions for Industrial, emergency team and chemical, biological, radiological, and nuclear situations are available.

Certified to both EN 943-1 (Protective clothing against liquid and gaseous chemicals, aerosols and solid particles. Performance requirements for ventilated and non-ventilated "gas-tight" (Type 1) and "non-gas-tight" (Type 2) chemical protective suits) and EN 943-2 (Protective clothing against liquid and gaseous chemicals, aerosols and solid particles. Performance requirements for \$OQgas-tight\$OR (Type 1) chemical protective suits for emergency teams). These are the highest level of certification recognised in the EU and Asia.



The suits are proven to serve effectively as a barrier against hazardous materials; they also exceed significantly the requirements for tensile strength, flex-cracking and puncture resistance. Along with EN certification, the ONESuit Pro line is certified in the United States to both NFPA 1991 (Standard on Vapour-Protective Ensembles for Hazardous Materials Emergencies) and NFPA 1994 (Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents).

Saint-Gobain's patent-pending CoreTech™ Barrier Membrane technology enables the lightweight – under 5kg – suits to deliver protection against chemical and biological agents in both liquid and vapour form. The flexible and robust single-skin is engineered for manoeuvrability and user comfort in the most challenging environments. Wearers also benefit from good visibility and superior flame resistance.

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In hero's footsteps

Following a two-year development programme, HAIX® has launched FIRE HERO®, a brand-new firefighting boot with a patented lace-zipper system that ensures the boot can be fitted perfectly and securely in a matter of seconds. With a single-motion "step in, zip up, fasten" closure system, the boot is also claimed to be the safest firefighting boot ever made, with more than nine cutting-edge innovations.

An ingenious system of protectors shields the ankles, instep and shin bone, plus there is also cut protection up to Class 2, which is particularly important when working with chain saws. A sophisticated shock-absorption system gently protects



the spine and a choice of three different orthopaedic insoles enables individual fitting for maximum comfort. Special technology incorporated into the leather reflects the rays of the sun instead of heating up the shoe, and anti-slip soles perform on any surface. FIRE HERO is designed to fulfil the highest safety requirements of fire and rescue services around the world. CrossTech® membrane incorporated into the boot prevents the penetration of

liquids, bacteria and even viruses into the interior. This means that firefighters wearing FIRE HERO boots can, for example, confidently wade through ankle-deep burst test tubes and exploded laboratory bottle "laboratory soup" following an accident in a biochemistry laboratory.

Officers at the southern fire service at Munich Airport tested the boots during tough training exercises. The lace-zipper system "ensures the boot can be fitted perfectly and securely in seconds," confirms firefighter, Wolfram Gerhard.

For more information:

Haix

Tel: +49 (0) 8751 8625 225. www.haix.com

Packexe SMASH Receives a Red Hot Welcome in Germany

PACKEXE SMASH is a time critical glass management product used within the fire & rescue industry for extrication at road traffic collisions. It supports the quick and easy rescue of the passengers as the film reduces the risk of the glass breaking, also allowing fire fighters to remove the glass quickly and in one piece.

Packexe SMASH is going from strength to strength and the most recent show, Interschutz 2010 turned out to be an extremely successful exhibition for them. The fire and rescue exhibition takes place every five years in Germany and this year it had 1350 exhibitors from 46 countries. The show experienced a heat wave with temperatures in Leipzig reaching 34°C in the shade! However, visitors still ventured to the stands and visitor statistics were predicted to total a dramatic 125,000.

Packexe SMASH kick started the show with daily live demonstrations in the outside showground. Fire Fighters from Leipzig used Packexe SMASH during a full extrication exercise, showing Packexe SMASH's performance under several different scenarios including wet conditions. The demonstrators showed how glass can be left in place during

extrication or broken and removed in one piece with the application of Packexe SMASH.

Packexe were pleased to welcome friends from extrication challenges across the world onto the stand alongside new enquiries from throughout Europe, North America, South America, Australasia, Africa the Far East and Asia. Interest in the Packexe SMASH stand not only came from fire fighters and distributors from across the globe but also television crews interested in the latest innovation. The interview between Retter television and Andrew Orchard, CEO of Packexe, can be seen at <http://interschutz.retter.tv/de/interschutz-beitrag.html?ereig=Extrication-Solutions-Save-Time-Lives-with-Packexe-SMASH%20%AE-&ereignis=3231>

CEO Andrew Orchard said "The reception in Germany was fantastic, and as we expected the product was very well received. The show is only every five years and the visitors expect to see new innovative products that will enable them to improve the extrication process. At Packexe SMASH we pride ourselves on innovation and producing products that will enable the highest standard of protection with an undisputed and unmatched



ease of use and we certainly gave them an innovation that opened their eyes to new forms of glass management. The show proved to be a great success for Packexe SMASH and we have generated a lot of awareness both with potential distributors and end users".

Packexe worked with UK Fire Stations for two and half years testing and developing products that will enable them to improve and speed up extrication at road side collisions. Packexe SMASH has since been launched globally through the UK Fire & Rescue Show, FDiC and Interschutz 2010. The company have also sponsored many international Fire & Rescue Challenges to generate awareness of the product and to give the fire fighters the opportunity to have hands on experience with the product in real life scenarios.

For further information you can visit the website and blog at www.packexesmash.com. or contact Kate Harvey, Marketing on 01392 438191, email kate@packexesmash.com



System offers integrated rescue hose



MSA describes its new ExtendAir II as an emergency breathing supply system (EBSS) option that uses intermediate pressure air to provide firefighters with another level of emergency air. It allows firefighters to quickly and easily connect to and breathe from a fellow firefighter's air cylinder, and is integrated with SCBA to provide unrestricted mobility as well as easy access during critical situations. The system uses a quick connect system with check valves to help ensure that both recipient and donor are not exposed to ambient air.

The new ExtendAir II system offers an integrated rescue hose that can be used with the PR14™ First-Stage Regulator and has both male and female quick connect fittings. A waist pouch houses the hose and manifold that integrates with the carrier and harness assembly to avoid snagging and accidental opening.

For more information:
MSA
Tel: 1-877-MSA-FIRE.
www.MSAFIRE.com

New dosimeter measures up

CASELLA CEL has redeveloped its lightweight, cable-free dBadge noise dosimeter to increase its robustness, allowing the dosimeter to be used in the harshest of environments with absolute reliability.

The redeveloped dBadge now features rubber over-moulding on the case to increase toughness, and provide protection from water and dust that is prevalent in mines and similar environments. The company has also added a new model to its noise dosimetry range – the CEL-350L dBadge "Lite". This offers simple functionality at what is claimed to be a very affordable price. The "Lite" measures the same occupational noise parameters as the original dBadge, except for the time history of exposure to noise levels, so is aimed at users needing straightforward, low cost noise dose results.

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Chemguard-Williams Alliance produces AR-AFFF advances



By John Vieweger

Vice President Sales & Marketing, Chemguard Fire Suppression Division

"A partnership of two industry leaders improves the performance and expands the applications of AR-AFFF firefighting foam concentrates."

In late 2009, Chemguard and Williams Fire & Hazard began a collaboration to advance alcohol-resistant aqueous film-forming foam (AR-AFFF) technology. The initial resulting products – ThunderStorm F-601B 1x3 AR-AFFF and Thunderstorm F-603B 3x3 AR-AFFF – exhibit significant improvements in effectiveness and efficiency. These new, high-performance, low-viscosity formulations offer improved burn-back resistance and high extinguishment speed and exceed the highest performance standards in the industry – even on high-octane gasoline.

AR-AFFF attributes

Effective at knocking down, controlling, and extinguishing Class B hydrocarbon fuel fires and polar solvent, water-miscible, fuel fires, AR-AFFF also suppresses the hazardous vapours emitted from the fires and spills of these fuels.

Polysaccharide gums and other stabilisers in AR-AFFF offer notable benefits on hydrocarbon fuels, such as increased foam stability, increased water retention in the foam, increased effectiveness in creating vapour seals against hot steel surfaces, and increased resistance to re-ignition of the fuel. AR-AFFF excels on large hydrocarbon fires, especially large flammable storage tank fires, because of its extended foam life and positive rim seal characteristics.

Firefighting foam systems in facilities that manufacture and refine a variety of polar solvent fuels often rely on AR-AFFF foam concentrates. In particular, with ethanol expanding as a fuel for automobiles AR-AFFF foam concentrates will also be required by many municipal fire departments.

Chemguard-Williams advancements

F-601B and F-603B was developed to far exceed current industry performance standards. The new AR-AFFF foams went through rigorous live fire tests at Chemguard's Fire Test Facility, including:

- UL testing: Obtained a ¾% listing for F-601B and a 1% listing for F-603B on hydrocarbon fires, and a 0.10 gpm/ft² (4.07 lpm/m²) application rate on isopropyl alcohol for both agents.
- EN 1568 testing: Received a "1A" rating on both hydrocarbon fuels and polar solvent fuels.
- LASTFIRE testing: Achieved performance level "good" for all nozzles in both fresh water and salt water (except the system nozzle with a



New Chemguard-Williams high-performance AR-AFFF formulations achieved 15% faster extinguishment times than other agents on the demanding Williams "Plunge" test. Exhibiting improved burn-back resistance, even on high-octane gasoline, these new AR-AFFF formulations also offer longer foam life and enhanced water retention

saltwater premix, where F-601B achieved performance level "acceptable").

- Williams "Plunge" test: Documented 15% faster extinguishment times than any previous products.

Importantly, these new firefighting agents produced superior results on the Williams "plunge" test, which assesses a product's suitability for demanding storage tank firefighting.

Chemguard formulated F-601B and F-603B from special fluorochemical and hydrocarbon surfactants, high-molecular-weight polymers, and solvents. The key components are fluorosurfactants, which affect film formation, fire control effectiveness, and extinguishment speed. These concentrates offer improved performance in foam proportioners, in-line eductors, balanced-pressure systems, and other equipment in part because they exhibit a dramatically lower viscosity than many 1x3 and 3x3 AR-AFFF products.

F-601B and F-603B also offer improved rim sealing for storage tank applications using fresh water and saltwater solutions, longer foam life, and better water retention, which leads to improved resistance to re-ignition and firefighter safety.

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For more information please contact:

Chemguard Inc
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Mobile solution scores in Scotland



According to INFOTERRA, following a recent order from Lothian and Borders Fire and Rescue Service, six of the eight services in Scotland now use the company's SAFEcommand mobile solution. Lothian and Borders has equipped 78 of its appliances with Infoterra's Vehicle

Mounted Data System (VMDS) to enhance the management and distribution of risk data and assist in ensuring front-line crews' operational safety at incidents.

The Infoterra equipment enables front-line personnel and back-office information managers to have access to the complete

picture of an emergency situation. It enables users to look beyond the risks at the incident property or location, and consider other essential information, for example, how to gain access to a nearby stretch of river. With a single touch, firefighters can switch between maps,

premises information, Computer Aided Design plans, brigade orders or Chemdata.

Due to its intuitive user interface it requires minimal training, keeping training costs low and making it a practical option for deployment. In addition, each fire and rescue service can process, manage, share and use its data without the need for third-party intervention. Crews can use the solution to reach emergency locations quickly with, for example, accurate route planning and mapping of access routes to emergency water supplies. The solution also provides access to essential location information, including the siting of hydrant locations or details of local hazards, such as the proximity to gas mains or chemical stores.

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New detector measures up to six gases



The new DRAEGER X-am 5600 is said to be the smallest portable gas detection instrument for the measurement of up to six gases. With an ergonomic mobile-phone design, it features innovative infrared sensor technology and provides accurate, reliable measurements of explosive, combustible and toxic gases and vapours, as well as oxygen. For personal monitoring applications, this light yet robust detector is designed for single-handed operation in tough industrial environments and is ATEX approved for use in explosive areas classified as Zone 0.

Using a combination of Draeger IR sensors and the latest Draeger XXS miniaturised electrochemical sensors, the Draeger X-am 5600 can detect a wide variety of hazards. These include O₂, CO, H₂S, H₂, CO₂, Cl₂, HCN, NH₃, NO, NO₂, PH₃, SO₂ and organic vapours.

Immune to poisons such as hydrogen sulphide (H₂S), Draeger IR sensors provide dependable warning against explosive and combustible hazards such as hydrocarbons and carbon

dioxide. They feature an extended sensor life of up to eight years, and require calibration only every 12 months, significantly reduced maintenance costs.

The new detector features gas inlets on both the top and front, a large illuminated display, and a clear 360 degree visual alarm. Equipped with a data logger as standard, the unit also allows data, such as measured values and configurations, to be transmitted via infrared interface to a PC. The data can then be analysed using the Draeger Gas Vision software, with optional user registration being carried out via the Draeger CC-Vision software. An optional external pump is available with hoses up to 20 metres for pre-entry measurements in tanks or pipelines.

For more information:

Draeger Safety UK Limited

Tel: +44 (0)1670 561200. www.draeger.com

New firefighters' helmet



Described as lightweight, rugged and comfortable to wear, the new ergonomic DRAEGER VFR Pro Helmet is designed for use in firefighting, industrial, marine, offshore and military applications. Available in two versions to suit the needs of high-heat environments, such as those found in structural firefighting, flash-over training and wildland firefighting, it is also equally suited to rescue and technical assistance operations.

The helmet is designed for both comfort and performance and is believed to be the lightest helmet to meet EN 443: 2008-B (Helmets for fire fighting in buildings and other structures). Maintaining clear visibility, even when worn with a gold-tinted visor, it offers the highest EN 166 (Personal eye protection) and EN 14458 (Personal eye equipment) optical performance levels with Class 1 for both eye shield and face shield. The helmets are available in thermoplastic and composite materials.

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ISG Thermal



ISG has been developing thermal imaging technology for almost 20 years. We pride ourselves on our exceptional product range and customer service, as well as our world famous image clarity, unrivalled in the industry worldwide.

Our in-house specialist development team works tirelessly on improving our products, as well as developing the technology available to the industry. This enables ISG to remain at the forefront of infrared technology development, allowing us to offer leading thermal imaging products on a global scale.

ISG Thermal Systems Ltd was founded in 1992 by two thermal imaging professionals specialising in firefighting. After developing and supplying a range of infrared fire detection products, during 1994 the company launched its first firefighting thermal imager – the ‘Talisman K90’, utilising pyro-electric vidicon tube technology and achieving performance levels far superior to other firefighting thermal imagers of the time. The product soon became popular with fire brigades in the UK, USA and Europe.

Building on commercialisation of solid-state detector technology by Texas Instruments and Raytheon Corporations in the United States, during 1996 ISG became the first in the industry to utilise UFPA (Uncooled Focal Plane Array) technology in the revolutionary Talisman K90C. It became an instant success, establishing ISG as the leading provider of thermal imaging for firefighting, and contributing to ISG winning the Queen’s Award for Enterprise in International Trade in 2001.

2002 saw the launch of the Talisman Spirit, utilising the size and cost benefits provided by α -Si (amorphous silicon) microbolometer technology to introduce a new generation of compact, “small-format” imaging products.

Another industry revolution occurred during 2003, as ISG launched the ‘Talisman Elite’, the first full-resolution microbolometer imager to appear in small format. The Elite also featured the ground-breaking Dual Transparent Colour feature, providing the user with 1000°C imaging and measurement capability. For the first time, the firefighter had a tool that could provide clear, intuitive imaging and measurement in flashover temperatures and beyond. These features were introduced in the lower-resolution, economy Elite Lite version in 2005.

Since 2006 the company have continued to successfully develop new and innovative products, further enhancing the quality of the thermal image with new technologies exclusive to ISG.

ISG’s innovative products incorporate some of the world’s most advanced imaging technologies, many of which are exclusive to ISG. We offer a broad range of thermal imaging cameras, suitable for use in firefighting, search and rescue, surveillance, detection, and many other applications. We specialise in providing industry-leading enhancement of the image quality of the thermal scene, allowing you to see more detail, and make better-informed decisions, even in the most extreme environments.

The latest essential innovation from ISG is ICET™ (Intelligent Contrast Enhancement) technology that has been developed specifically for use in firefighting, although this technology can be applied to law enforcement and search and rescue products as well.

ICET™ is ISG’s exclusively developed image enhancing technology, available in all ISG products. Conventionally, a thermal imager will operate with maximum sensitivity in low-heat environments ((Normal Mode). However upon detecting scene temperatures above a predefined threshold, the sensitivity level is switched to minimum (Fire-fighting or Thousand Plus Modes). This enables the high level data to be viewed by increasing the dynamic range of the detector – but at the expense of contrast in the cooler parts of the scene.

To overcome the compromise between dynamic range and low-contrast sensitivity in high-heat scenes, ISG has introduced its patented ICET™ technology. Developed specifically to enhance thermal imaging performance for infrared applications, ICET™ enables ISG thermal imagers to provide uniquely detailed background images even when viewing the hottest scenes.

ICET™ technology ensures the user sees the clearest and most detailed image at all times, helping them to make best-informed decisions, no

For more information please contact:

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Tel: +44 (0) 1268 527700
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Website: www.isgfire.co.uk

Systems

matter how severe the conditions or how high the temperature.

Our exceptional range of products are simple to use, with a variety of fully automated features installed to provide maximum information with minimum intervention. In addition, we offer several optional features to help further enhance your product to suit your desired needs.

ISG designs, develops and manufactures a variety of infrared products at our own specialist development facility in the UK, dedicating substantial investment resources to the development of thermal imagers and technologies to improve imaging capability for the most extreme conditions.

Thousands of progressive fire, law enforcement and naval departments worldwide choose to rely on ISG thermal imagers because they know that when you purchase from ISG, you get a quality product that provides outstanding image clarity, ease of use, powerful functionality and ultra toughness.

ISG offers a range of high-performance thermal imaging products, including the 1000 Series, 250 Series and X3 Surveillance. These products each have a unique feature set, designed to suit a variety of specific applications.

1000 Series

The 1000 Series are the highest resolution fire-fighting thermal imagers available today. These unique cameras use a 384 x 288 resolution detector in conjunction with our exclusive ICE™ technology to produce the sharpest, clearest thermal image available. This ensures the user has the maximum amount of scene information on the screen, enhancing decision-making ability and helping to save lives.



SD1000

In addition, the 1000 Series has a x2 and x4 Zoom function and Image Capture facility among a variety of extra features, providing super-rich functionality without any complicated operations. The 1000 Series are quite literally the best value for money high-resolution thermal imagers available anywhere in the world.

250 Series

The 250 Series combine our standard resolution 160 x 120 resolution detector with our Eco-Clear Sensor technology and the latest essential ICE™ Technology, developed exclusively by ISG for use in firefighting.

This combination of state-of-the-art technological advances provides the user with unrivalled image clarity and extra headroom, ensuring all the key scene information, such as an exit route or a trapped victim, is available to the user at all times.



K250

The 250 Series also include built-in Image Capture facility amongst other features, are simple to use, and all available at an economical price.

X3 Surveillance

The X3 Surveillance thermal imaging camera is a uniquely crafted, high specification product with numerous features exclusive to ISG. The X3 Surveillance uses an ultra high-resolution detector (384 x 288 pixels) that provides a crystal-clear image of even the most distant scenes. Its superior resolution detector, and extra-long range lens enables the user to detect a man sized object at 2000 metres.



X3
Surveillance

The X3 Surveillance also has a x2, x4 and x8 Zoom feature as well as polarity adjustment, contrast and brightness enhancement and various operating modes. The latest X3 Surveillance is also available with Image Capture as a standard feature, enabling the user to record 30 images for training or reviewing at a later date.

And in addition, this incredible product is also suitable for hand-held or fixed installation imaging, offering even more versatility in one product. All these features, and more, ensure this thermal imager offers all the functionality you need.

If you have any questions or would like to know more about our exclusive product range please do not hesitate to contact our customer services team who would be delighted to assist you.



IVECO MAGIRUS builds the world's longest articulated turntable ladder

In 1872 Conrad Dietrich Magirus introduced the first free-standing, mobile fire brigade ladder. The company, which still bears the name of its founder, has been carrying on this great tradition for nearly 140 years. Today MAGIRUS remains the leader in technology and innovation in the field of turntable ladders used by fire brigades. Time and again, developments from Ulm in Germany have set standards for the entire industry. It was IVECO MAGIRUS, for example, that introduced the world's first articulated turntable ladder technology in series production back in 1994. Their functionality and reliability are borne out by an impressive milestone when receiving recently its 500th order.

Proven hundreds of times, the "MAGIRUS GL" with CS technology (Computer Stabilised) is now available in its second generation. The operating height of the articulated ladder was previously limited to 30.5 metres, but has now been extended considerably. The new GL-T 35 reaches a rescue height of 33.5 metres, permitting an operating height of an unrivalled 35 metres. So far, turntable ladders with these performance value have been supplied only to Asian customers.

The 35 GL-T fits a five-section MAGIRUS ladder set. To this a 3.50-metre-long articulated section is added, together with a 1.20-metre-long telescopic section, resulting in a whole telescoping articulated section with a total length of 4.70 metres. This additional three metres represent a full storey of a building!

The new MAGIRUS 35 GL-T ladder is mounted on a two-axle IVECO EuroCargo 160 E 30 chassis with a wheel base of 5.315 metres and a total weight of 16,000 kg. This means this turntable ladder complies with all European standards and can be used by all fire brigades. The engine is rated for 220 kW (299 hp) and the Allison 3000 PR automatic transmission is fitted with an additional retarder. Automatic snow chains on the rear axle ensure safe progress under winter driving conditions. The entire vehicle is painted an appealing RAL 3024 fluorescent red.

The modular AluFire equipment lockers provide ample space to store the standard equipment, along with an extensive supply of additional equipment. A generator and a positive-pressure blower are carried on the turret. A stretcher rated for up to 200 kg can be



The new Iveco Magirus 35 GL-T ladder fitted onto the Iveco EuroCargo 160 E30 chassis

mounted on the three-person rescue cage. In addition to a colour imaging camera mounted to the cage as standard, an optional thermal imaging camera is also available. Images from both cameras are displayed on the same MAGIRUS screen used to monitor the turntable ladder.

Manual branch pipe or a remote controlled, electrically operated water monitor can be mounted in the cage. Because of the two available multi-function columns, both monitors can also be mounted simultaneously for operations requiring relatively large quantities of water.

The works fire brigade of the Boehringer Ingelheim plant in Biberach, Germany, recently took delivery of Europe's first 35-metre turntable ladder from IVECO MAGIRUS.

Boehringer Ingelheim is one of the world's leading pharmaceutical companies. The Biberach production plant is home of the company's Campus for Research, Development and Biotechnology. Some 4,000 employees and more than 250 trainees work at the facility.

The works fire brigade is staffed by more than 50 full-time and volunteer fire fighters. The team is extremely well trained and equipped with all of the operational vehicles and equipment needed to handle fires and hazardous materials. The latest addition to the fleet is the IVECO MAGIRUS 35 GL-T, a state-of-the-art, high-efficiency aerial rescue unit.

With facilities at six European locations, the IVECO MAGIRUS Group develops and produces a range of vehicles and equipment unlike any other in the world for firefighting and civil protection. IVECO MAGIRUS is one of the world's biggest and most technologically advanced providers in the sector, and has an international sales and service network.

IFF

For more information please contact:

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Tel: +49 (0) 731 408 0
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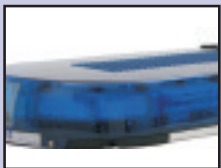


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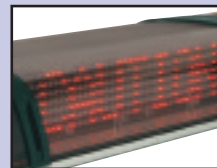
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A Clearer View of Thermal Imaging

By James Humpoletz

ISG Thermal Systems Ltd

For firefighting applications, thermal imaging is still often considered to be an optional piece of equipment, but this attitude is changing, as James Humpoletz explains.

Thermal imaging technology has become one of the most important vision-aiding tools of modern-day scientific development. Its availability in hand-held, fixed and pan/tilt systems offers enormous flexibility in terms of installation and practical use. Its installation in a wide number of different applications has led to an extraordinary amount of technological development being carried out to offer more advanced, smaller and lower cost systems with enhanced functionality and better usability.

Thermal imaging can be found in a whole host of different applications and industries all over the world, from military and security surveillance, to firefighting and marine search and rescue. This technology provides the user with essential information about the surrounding environment, helping to keep them safe while offering a visual aid to help them to do their job.

For many years, thermal imaging has been used in military applications, such as weapon sights and night vision devices, although many of the early

systems required bulky cooling arrangements. However, it was the arrival in the late 1980s of smaller, more compact infrared sensors that, when combined with the advances in micro-processing, allowed thermal imaging to diversify into other newer applications.

Most notable was its introduction into firefighting, where the use of hand-held thermal imaging technology enabled firefighters to operate completely unimpeded by smoke or darkness. High levels of heat and humidity, the possibility of building collapse, as well as fatigue and stress levels, are all major contributors to making the firefighter's task incredibly challenging. However, with the use of thermal imaging technology, the firefighter can now combat a fire with more visual information about the surrounding environment than ever before, helping to keep him or her safer and become more effective during search and rescue operations.

More recently, thermal imaging technology has become more and more an essential navigational

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The Argus4 is designed specifically for firefighters. Its high resolution detector, crystal-clear display screen, and up to x4 zoom ensure maximum

visibility in any situation. It's also extremely light at just 3lbs but not at the expense of its strength.

The Argus4 is one of the toughest cameras out there, withstanding extreme temperatures thanks to its rugged and durable casing. And with SceneSave image capture for up to 100 images, plus spot and ambient temperature detection, the Argus4 really can give you the courage you need to do your job.

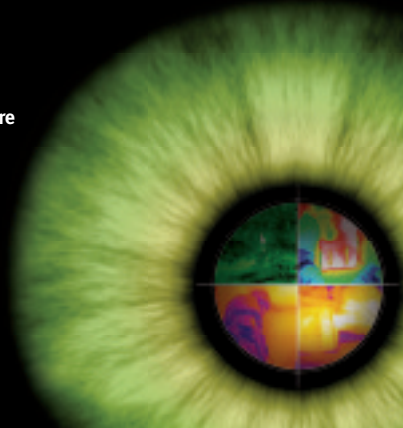
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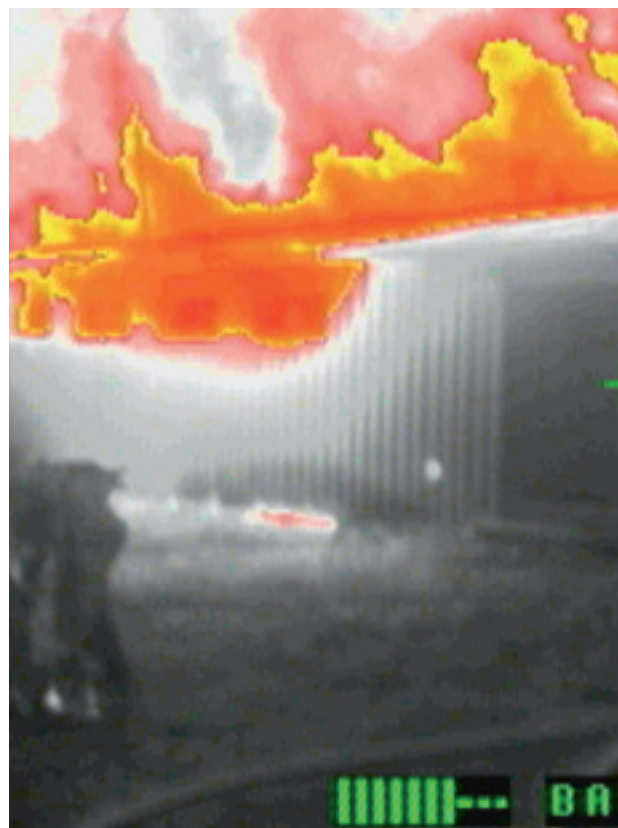
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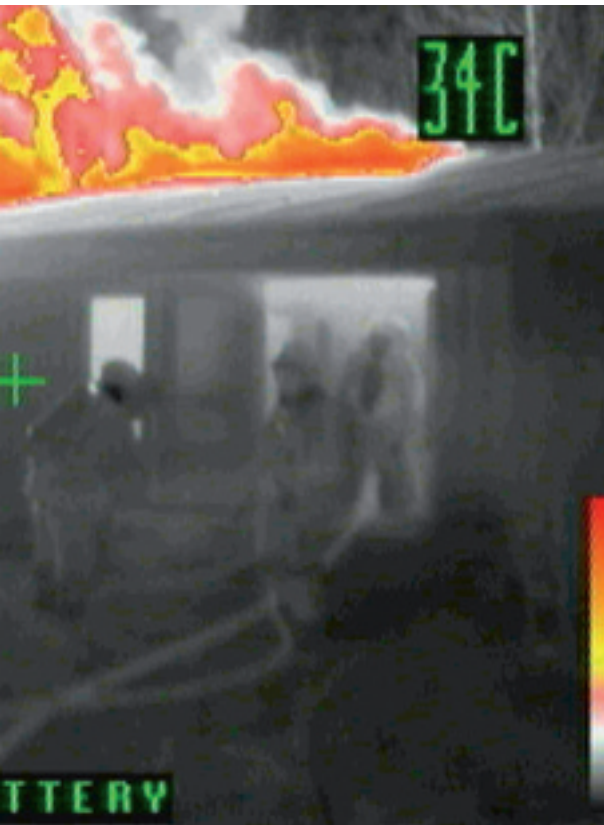
and information tool, providing the firefighter with even clearer thermal images of the surrounding environment, as well as providing other key data such as the temperature of the scene.

When used with breathing apparatus, the thermal imaging device enables the user to see and direct the firefighting crews, readily locating unconscious casualties and speeding-up the total search of the smoke filled structure. The user can also identify the thermal flow of hot gases from the fire source, see hazards such as hanging wires, holes in floors and unprotected openings, which could otherwise seriously endanger the safety of the firefighting crew.

Elsewhere, thermal imaging has become increasingly popular in various other industries. Most notable of these is within surveillance, security and law enforcement applications, where long-wave infrared technology can offer a superior alternative to image-intensified night vision, and has aided police officers and border guards alike in upholding the law and protecting innocent civilians.

Whether searching for drug farms, illegal immigrants, unauthorised personnel or even suspects on the run, thermal imaging can provide the essential information that these agencies need to crack down on lawbreakers. Its installation into vehicles, such as cars and helicopters, as well as the development of smaller hand-held devices, has helped make this technology more readily accessible and even more useful.

Aside from firefighting and law enforcement, other industries have also been identified as potentially benefiting from thermal imaging technology. In particular, is its use within a marine environment, and for assisting car drivers in low-visibility situations.



In the marine environment, hand-held and fixed infrared systems are being used for such applications as search and rescue, on-board firefighting and piracy detection. Significant enhancements of infrared technology have helped to provide even clearer thermal images at long distances, making it ideal for security and surveillance applications.

As for vision enhancement for drivers, fixed thermal imaging systems offer the user a different visualisation of the environment, which makes it an ideal support tool when driving at night or in fog. Many car manufacturers are already installing thermal imaging devices into their products as an added feature and it is likely that, with the advantages this technology can offer, these systems will become a standard feature in many vehicles in years to come.

Realising the full benefits that come with the correct use of thermal imaging technology is largely dependent on providing the user with the appropriate level of training, both in operation of the system and in understanding the characteristics of thermal images. A number of thermal imaging camera providers offer training to users to ensure the safe and proper use of their products.

An important aspect of the proper use of thermal imaging cameras, and to make the most of their capabilities, is the ease with which the user can correctly interpret the heat images displayed by the camera. The thermal image is displayed in colour scale and the spectrum of colours assists with interpretation of the thermal scene. The colours in the thermal image correspond to temperature boundaries associated with the colour scale. For example, if the scale is from black to white, then the hotter the object, the whiter it would appear on the camera display. In many products, especially for firefighting applications,



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colours such as red or yellow have been introduced to provide instant visual representation of high temperatures, further improving ease of interpretation.

However, thermal images are dynamic – they are changing constantly as the user advances into different temperature environments, and the important information contained in the heat images has to be understood and evaluated as part of the overall operation. The interpretation of the changing heat images from white through various shades of grey to black, and successful application of the relevant information to operational strategies and tactics, requires regular training, just as with any other piece of equipment.

The use of thermal imaging cameras should never, of course, replace standard operating safety practices – thermal imaging cameras should be regarded as an important navigational and information gathering tool, which in well-qualified hands can help save lives and enforce the law. As thermal imaging technology has improved, the industry has become increasingly more competitive, resulting in a broader range of products being manufactured, and all at competitive prices.

As well as helping to ensure the customer is offered the best possible product at the best possible price, competition has also encouraged other technological developments to take place to further improve the functionality of thermal imaging cameras across-the-board. These developments include additional features such as video recording systems, zoom functions, and interchangeable colour palettes, as well as newer, more advanced techniques for image processing and image enhancement.

Several manufacturers have also developed hands-free thermal imaging modules and although these developments are still in the early stages, we can expect this technology to improve dramatically in time, offering even more flexibility for the user.

Other factors have also impacted on the direction these developments have taken, such as the recent introduction of the new NFPA 1801 [Standard on Thermal Imagers for the Fire Service] in

the United States. In some respects this standard may offer limitations to customers, as this document will standardise the production of thermal imaging cameras. However, since this standard is only applicable in the US, other parts of the world should not be affected by the new legislation.

These developments have been key in the progression of thermal imaging technology and have led to even more advanced concepts of technological improvement being drawn up for the future. As with all modern-day technology, thermal imaging is constantly being updated and improved and the next generation of thermal imaging breakthroughs may in fact not be very far away.

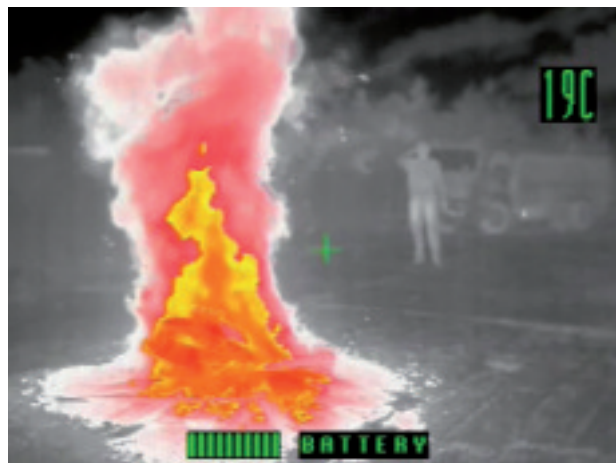
Products currently available are already becoming much smaller and more compact, in spite of the additional features that have been developed to accompany the infrared technology. It is more than likely that this reduction in size and weight will continue and, as such, more practical hands-free technologies will be developed in future for lightweight head mounted applications.

For firefighting applications, thermal imaging is still often considered to be an optional piece of equipment, but this will most likely change in time and its use become compulsory, just as other firefighting equipment has in the past. Breathing apparatus was not compulsory for firefighters until 1955 and yet it is unimaginable that, less than 60 years ago, firefighters had to hold their breath when entering a burning building. In the same way, it is not unreasonable to think that in the near future this essential technology that allows the user to see will become just as vital as breathing apparatus that allows the user to breathe.

Overall, thermal imaging has become increasingly more accessible in all applications right across the globe and as costs continue to decline, we would expect that the technology's accessibility in less developed parts of the world would increase as well.

The thermal imaging industry has grown substantially within the past two decades, and this growth has helped ensure the continued development of the technology itself, as well as the applications for which it can be put to use. And with more and more people understanding its various uses, features and benefits, thermal imaging will continue to offer the world enormous advantages in vision aids and image enhancement for many more years to come.

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James Humpolett
co-ordinates the marketing
activities at ISG Thermal
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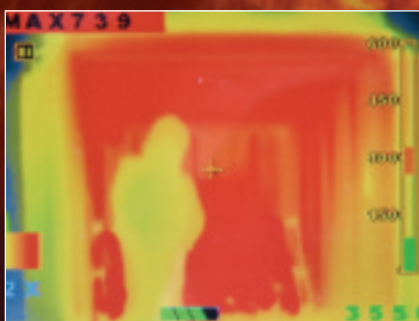


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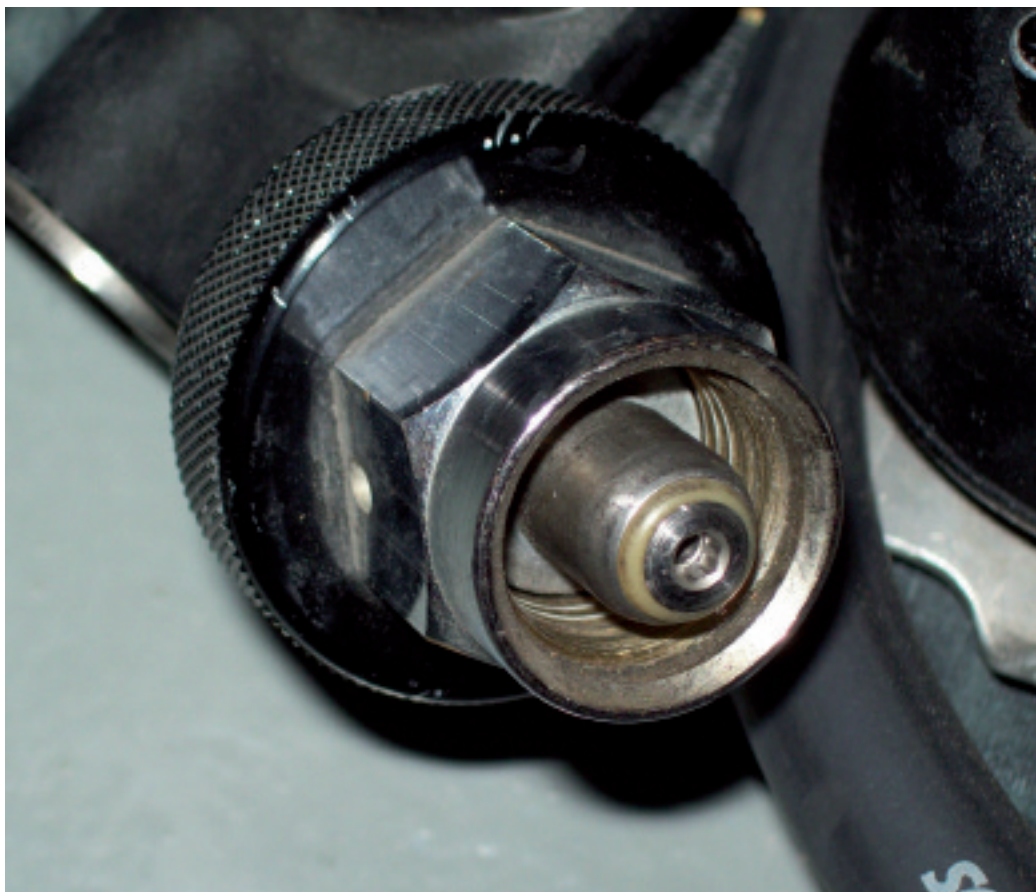
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**By Mark van
der Feyst**

Fire Star Training
Services

We all know the routine; every time we come on shift or conduct our monthly or bi-weekly truck checks, we are supposed to check our SCBA [Self-contained Breathing Apparatus]. In the full time departments, this is part of the Standard Operating Procedures or Guidelines. In volunteer departments, this is also a part of the basic operational procedures. So how come we are not checking our SCBA's correctly and routinely? This is a question that every firefighter must answer for himself or herself. Do you check in your SCBA on a consistent basis, and are you thorough about it?

Your SCBA is a vital piece of the PPE (Personal Protective Equipment). With this piece of equipment we are able to protect our respiratory system – which is the biggest system that needs protecting in order for our bodies to function – from any and all hazardous atmospheres. It is also the easiest system to penetrate with hazardous environments. One breath of a toxic substance can have immediate effects on your health. Time and time again we read about fire-

fighters who are dying today because of what they inhaled years ago, when SCBA was not as popular or available. The WSIB (Workplace Safety and Insurance Board) of Ontario, Canada has gone on an advertising campaign within the fire service to promote the wearing of our SCBA. It seems that we still are not getting the message.

Our SCBA equipment is tested to stringent standards as set forth by NIOSH (National Institute of Occupational Health and Safety), and every piece

When checking your cylinder, it is a good idea to check the hydrostatic date, the initial service date and the cylinder's rated pressure



of SCBA we use today in the fire service is NIOSH approved. This means that NIOSH took the SCBA and tested it to their standards, NFPA standards and other pertinent standards to ensure that it will protect us in an IDLH (Immediate Danger of Life or Health) environment. Our SCBA is given a rating of 10,000 by the NIOSH people, which means that, for every 10,000 particles of substance in the environment, only one particle will make it through the SCBA. This is the highest rating that we could have for our respiratory system protection. Our N95 mask has a rating of only ten. A full face respirator has a rating of 50. We are given the best protection for our lungs and we do not even know it.

I have seen many people in the course of my time on the job check their SCBA, both full time and volunteer, and I must say that – for the most part – we do a very poor job. Most people just look to see if they have a full bottle and that is it. I have seen others who rely upon the driver of the truck to check their SCBA. This I do not understand. How do you know if your SCBA is working properly or not? The only way to know is if you check your own SCBA. This is your protection for your lungs, so do not rely upon some other person to check for you. Perhaps that other person does not hold as high a regard for checking in a SCBA as others do or even you. So, check it yourself!

So how should we check our SCBA's? There is a simple check system that I am going to share with you. If you follow the points entirely, you will have completed a thorough check of your SCBA. It may a little time in the beginning, but after a few times, you will be able to complete this check in as little as five

minutes. This system will work with any name brand SCBA.

- 1** Visually inspect the complete respirator for worn or aging rubber parts, worn or frayed harness webbing or damaged components.
- 2** Check the air cylinder for the latest hydrostatic test date to ensure it is current. Aluminium cylinders every five years and carbon fibre every five years.
- 3** Aluminium air cylinders. Visually inspect the air cylinder for dents or gouges in the metal. Cylinders that show exposure to high heat or flame, such as paint turned brown or black, decals charred, gauge lens melted, or the elastomeric bumper is distorted should be removed from service, emptied of compressed air, tagged and sent for repair.
- 4** Carbon Fibre Air cylinders. Visually inspect the cylinder for cuts gouges greater than the stamping on the bottle. Check for signs of structural damage, such as bulges or concave areas. Check for signs of heat as mentioned above.
- 5** Check the air cylinder for full indication.
- 6** Ensure all air is bled-off the system by opening the purge valve located on the regulator. Remove the reducer hose coupling and check the condition of the nylon nipple seal. Be sure there is an O ring present. Close the purge valve.
- 7** Check to ensure the reducer hose coupling is hand-tight to the air cylinder valve outlet.
- 8** Check to ensure that the breathing regulator purge valve is closed.
- 9** Check face piece assembly. Inspect the following:
 - a** Check the overall condition of the Kevlar head harness and four-point adjustable straps.
 - b** Check the overall condition of the rubber seal.
 - c** Check to ensure that the nose cup is intact and attached to the mask by way of plastic retaining ring.
 - d** Check to ensure both exhalation valves are firmly attached to the nose cup.



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When checking your SCBA, it is a good idea to lay it out



- e Check to ensure that both voice emitters are attached to the nose cup.
- f Visually check for any cracking of the face-piece lens. Check the outside of the face piece to ensure that both plastic tabs are in place and free from any cracking.
- g Check to ensure the voice emitters mounting bracket is secured.
- h Don the apparatus and attached the face piece.
- 10 Fully depress or push in the donning switch and release.
- 11 Slowly open the air cylinder valve fully. Compare the chest gauge with the bottle gauge to ensure that both pressure readings are within 100 psi of each other.
- 12 Don the face piece and ensure you have a good seal.
- 13 Inhale sharply to automatically start the air flow.
- 14 Breathe normally from the face piece to ensure proper operation.
- 15 Remove the face piece from your face. Air should freely flow from the face piece.
- 16 Fully depress or push in the donning switch. The flow of air should stop.
- 17 Rotate the purge valve a half-turn counter-clockwise. Air should flow freely from the regulator.
- 18 Return the purge valve to the closed position. Air flow should stop.
- 19 Fully close the air cylinder. Open the purge valve slightly too slowly vent the residual air from the apparatus. As the residual air vents, the remote gauge needle will swing from the FULL mark and move towards the EMPTY mark. Close the purge valve when the gauge needle crosses the quarter mark, but before the beginning of the RED empty band. Slowly open the purge valve again, the Alarm Assembly and Audible alarm from chest gauge should actuate as the needle crosses the quarter mark. When the air flow has stopped, return the purge valve to the fully closed position. Deactivate the alarm by needed means recommended by the manufacturer. The gauge will not stop chiming until deactivated. The test is complete. If the purge valve or donning switch fails, tag and take out of service

As for the PASS alarm, some SCBA has integrated PASS alarms and some do not. If your SCBA does have an integrated PASS alarm, follow these steps:

- 1 Check to ensure battery is fully charged.
- 2 Turn on SCBA The PASS alarm should activate.
- 3 Let the PASS alarm or SCBA sit motionless for 20 seconds. The pre-alert alarm should sound. At this point reset the alarm by shaking the SCBA or the PASS alarm.
- 4 Let the SCBA sit motionless again for 20 seconds. When the pre-alert alarm sounds, deactivate by pushing the appropriate button on the PASS alarm.
- 5 Let the SCBA sit motionless again. When the pre-alert alarm sounds, let it go to full alarm. Reset the alarm by pushing the appropriate buttons on the PASS alarm.
- 6 Manually turn on the PASS alarm by pushing the full activation button. Reset the alarm as in step number 5.
- 7 At this point you have checked in your PASS alarm completely. Deactivate your PASS alarm when you have drained all the air from your system and then depress the appropriate buttons.

If you have a manual PASS alarm, the only different step will be to turn on your PASS alarm manually.

This generic system of checking in your SCBA can be customised to suit the operational differences of your particular SCBA model. This simple check will ensure that your SCBA will be fit for duty when you need it most.

Remember that your SCBA can be divided into 4 main parts: face piece, back plate assembly, cylinder and regulator. If you check each one of these components thoroughly, as described above, your SCBA will be ready for service every time, all the time. Be sure that your SCBA is ready. It is there to protect you!

IFF



Here we can see the O ring is present

Mark van der Feyst is an instructor with Fire Star Training Services
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Cut, Crush and Prop

The latest hydraulic rescue tools at Interschutz



By Graham Collins

The recent Interschutz exhibition in Leipzig, Germany saw a flurry of activity from the leading hydraulic rescue tool manufacturers. IFF Editor, Graham Collins, overviews just a few of the headline-making tools.

According to the World Health Organisation, globally a staggering 1.2 million people die every year in road accidents and a further 50 million are injured. Add to this the fact that, so far this year, well over a quarter of a million people have been killed in natural disasters, and it is easy to see why there was such widespread interest shown at Interschutz on the latest hydraulic rescue equipment.

Certainly, several of the global market leaders used the show to unveil their latest developments or focus on their best-selling solutions. This included hydraulic cutters that today have enormous power and have become even more vital pieces of equipment on the rescue scene than ever before. This is due both to advances in vehicle design and construction and improvements in cutter technology. Spreader tools also featured prominently; a powerful tool that can prove invaluable during the victim extrication process. Rams too are an essential part of the hydraulic tool set and can play a decisive role in situations where the front of the vehicle is causing entrapment of the occupants.

German manufacturer, Lucas, launched what it

describes as the first complete set of rescue tools worldwide that works entirely without power units and hoses. The new line-up uses what the company calls eDRAULIC technology that is aimed at setting new standards in vehicle extrication.

With eDRAULIC electrohydraulic technology, an ordinary power socket is all that is needed to provide the same power as a large and heavy petrol or electrical power unit. The eDRAULIC tools, which comprises a cutter, spreader and rescue ram, deliver at least as much power as hose-bound rescue tools. Thanks to modern lithium-ion batteries, the eDRAULIC series can also be used without cables – but with full power – which is a major advantage in multiple crashes or off-road work.

Since with eDRAULIC technology power units and hoses are no longer necessary, rescue teams also save space on their trucks, freeing-up room for other items of rescue equipment. The new Lucas tools are also claimed to weigh 50 percent less when compared with conventional rescue sets.

Each of the tools can be started simply by pressing a button; they are then ready immediately for

Holmatro Concrete Crusher



action. Changing from battery to cable operation is also quick and easy, resulting in a considerable reduction in the time between arrival at the emergency site and the start of rescue operations.

The latest introduction from Weber-Hydraulik in Germany is its new Xtreme cutter. It is being heralded as combining perfectly balanced power with unrivalled cutting performance that ensures that the materials used in modern car, bus and truck manufacture are tackled with ease.

The new hydraulic cutter incorporates forged high-performance blades with a bolt cutting recess. The cross-over, high-performance blades ensure a "perfect" move-in cut, fully utilising all the available power to complete the cutting operation. A 360 degree rotatable and detachable handle boosts its ease of handling and makes the Xtreme cutter ideal for use in restricted or confined spaces, while its lightweight construction results in Weber-Hydraulik claiming that the Xtreme cutter achieves the highest power-to-weight ratio.

Netherlands-based Holmatro unveiled a whole raft of rescue products at Interschutz. This included a number of hydraulic rescue tools including a new mini cutter, a new concrete crusher and a new ram. All utilise Holmatro's CORE – Coaxial Rescue Equipment – technology that controls the way in which hydraulic oil is directed from the pump to the tool and vice versa.

The new Holmatro Mini cutter CU 4007 (C) is suitable for both round and flat profiles. It is designed for applications such as cutting car pedals and head restraints in vehicle accidents, and cutting reinforcement bar in urban search and rescue operations. Its ease of use in confined spaces is thanks to its extremely compact design and push-button, one-handed operation. It is the ideal tool to use alongside the new Holmatro

mobile concrete crusher, which is engineered to break up large, thick chunks of concrete – up to 230mm thick – to provide access into collapsed structures following an earthquake or explosion.

The company's new Extendo ram XR 4360 (C) offers both manual and hydraulic extension, saving valuable time when every second counts. Manual extension enables quicker and more precise positioning, allowing spreading to start almost immediately.

Like all of the leading suppliers, Germany's Lancier Hydrauliks took the opportunity to show a broad spectrum of its hydraulic rescue equipment. Its hydraulic cutting equipment on display, for example, featured a selection of cutting tools with different blade openings up to 250 mm and blades – that are exchangeable and can be re-ground – with a cutting force up to 1102 kN.

The company's spreaders also featured prominently. Manufactured from high-strength yet lightweight metal alloy, they boast spreading widths up to 820mm and spreading forces up to 694 kN. Lancier's uniquely designed combination cutter and spreader has the potential to reduce the number of items of equipment carried by rescue vehicles. These have a spreading width up to 460mm and a cutting force of

up to 729 kN.

In the final analysis, of course, each rescue tool has its own unique benefits and these have to be matched against the type of incidents and their probable locations the purchasing fire and rescue service is most likely to have to face. It is all a matter of having the right tool, at the right time, at the right place. We are fortunate to have such a wide choice of equipment available but we should never forget just how lucky we are to also have the skilled and dedicated people to use them. **IFF**



Holmatro Extendo Ram

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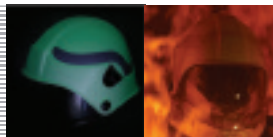
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It's Festival Time

**By Duncan J White
and Suzie Izzard**

Devon and Somerset
Fire and Rescue Service

Open-air festivals have the potential to be anything but easy-going, carefree events, as the recent disaster at the Love Festival in Germany so clearly showed. So here, Duncan White describes how the Devon and Somerset Fire and Rescue Service achieved zero fire related injuries at this year's Glastonbury Festival.

Glastonbury Festival – or to give it its full name, The Glastonbury Festival of Contemporary Performing Arts – is known as the largest green-field music and performing arts festival in the world. This year it celebrated its 40th anniversary and, for six days, the event transformed a rural part of the Somerset landscape into a virtual seven-square-mile city with an entire infrastructure to support the 177,500 festival goers, performers and staff.

Undoubtedly, the annual event is a unique experience for the public. It also represents a major challenge for the emergency services that are engaged to ensure public safety throughout the duration of the event which creates a tented city for a population approximately one and a half times the size of Exeter.

Much of the task falls to the Devon and Somerset Fire and Rescue Service (DSFRS) that provides around-the-clock resilience and support as part of a multi-agency approach. To ensure that public safety is maintained, it assigns resources to cover operational response, fire protection and enforcement, fire prevention and education, and a strategic command team.

To facilitate a ready exchange of information and ensure an orchestrated “partnership” approach, the fire service on-site team worked

from a compound it shared with the South Western Ambulance Service NHS Trust, and alongside the Avon and Somerset Police compound. Silver Command command-and-control meetings took place three times a day and allowed the DSFRS to respond in support of other agencies, while also building rapport and close working relationships.

DSFRS's on-site operational resource at the festival consists of ten personnel crewing a Mercedes high-mobility, all-wheel-drive multi-terrain fire appliance and a Land Rover equipped with a small water tank and high-pressure Brendon Pump. The crew was made up from the DSFRS Special Operations Team that has capabilities in firefighting, water rescue, rescue from height, extrication, enhanced search and rescue, together with the ability to deal with incidents of a catastrophic nature.

Lee Howell, DSFRS's Chief Fire Officer, visited crews on site to gain a firsthand appreciation of the risks involved in such a huge crowd. He commented: “Glastonbury is such a diverse melting pot of cultures, people and risks, but through effective pre-planning and flexibility on site, DSFRS has again helped ensure the safety of all those attending.” He continued: “I never cease to be amazed at the sheer professionalism of Devon and Somerset staff who again demonstrated the very highest standards the public has come to expect.”

Councillor Mark Healey, Chair of Devon and Somerset Fire Authority, who also hosted the Chair of Somerset County Council, added: "Glastonbury brings in a lot of money to the local economy and is recognised internationally as a major annual entertainment event. The eyes of the world focus on this quiet village in Somerset and I am delighted that our Fire and Rescue Service works so well with partners to ensure safety throughout this event."

Fire prevention and education

The Glastonbury Festival provides DSFRS with excellent opportunities to engage with everyone attending the site, be that ticket holders or those involved in the management, administration or the day-to-day running of the event.

Basic fire safety information is contained within the event guide that is given to each festival goer when they receive their ticket, and during the festival event-specific fire safety messages are sent out to mobile phones via Bluetooth technology. Daily broadcasts, including proactive advice in response to incidents / activities are aired on Glastonbury's local radio station, Worthy FM, which broadcasts directly from the site 24-hours-a-day throughout the festival. Event-specific safety banners are erected in all on-site car parks.

A dedicated Glastonbury Festival page is included on the Devon and Somerset Fire and Rescue Service website, which has links to daily press releases relating to event-specific issues. These press releases also generated interest from media across the counties.

The travelling communities of gypsies, travellers and showmen attend Glastonbury to work throughout the festival and the opportunity



was taken to visit the mixture of caravans, vans and trucks offering fire safety information, as well as distributing free smoke alarms and carbon monoxide detectors.

Liz Clegg, a retained firefighter from Totnes, was one of two officers that undertook this task. She said: "Community safety work is an important part of our role in the fire service. In order to help people stay safe it is important that we understand, talk to and listen to them in a language that they can relate to. By walking around and chatting to gypsies, travellers and showmen we can focus on their needs and tailor our home safety visits to suit them." She concluded: "We know that many are not accessing the range of





services that settled people do automatically, so we make sure that we take the message to them."

Fire protection and enforcement

A large number of entertainment marquee venues are set up within the bounds of the festival site, many of which are large capacity structures that can take audiences of 5070, 3740 and 2670. There are also open-air stages with capacities for over 90,000, plus an array of 19 market areas that contain food catering outlets, bars and general stores that cater to the general public.

The Regulatory Reform (Fire Safety) Order 2005 applies to on-site entertainment venues, market stalls and to the off-site sleeping accommodation. DFSRS is the enforcing authority for this fire safety legislation and has the statutory duty to see it is correctly applied. The main focus of our activities went on gauging the level of compliance by responsible persons with the emphasis on education and informing.

Prior to the festival opening to the public, teams of experienced fire safety protection and enforcement officers, drawn from group support teams from across the Service, carried out audits on the principle venues and market traders using a special event check sheet that has been specifically designed by DFSRS for this type of event. The team also visited the smaller market traders who had been sent basic fire safety risk assessment forms as part of their traders' pack. Their premises were audited to ensure they were in compliance with the Fire Safety Order and advice was offered where necessary.

The teams completed 143 audits during the week, with 89 satisfactory outcomes and 54 unsatisfactory; the consistent reason for failure being that traders were simply not completing their risk assessment. In future it may be necessary that, in order for traders to be able to book their pitch, they will need to complete their assessment pack. Market stalls were also being incorrectly sited and not leaving sufficient room at the rear to allow for a means of escape. Lastly, inappropriate materials were being used in the construction of stalls, such as plastics and other combustible materials.

One trader was reported to be selling Chinese lanterns, which have been banned at Glastonbury

for some time. Marc House, Station Manager from the Yeovil Group Support team said: "On discovering a gentleman selling Chinese Lanterns the Community Safety Prevention and Community Safety Protection team worked closely with the market manager to deal with the problem. The market manager involved her staff and security to ensure that this individual and any others that were found to be selling lanterns were removed from site."

World cup festival fever

This year the Glastonbury Festival coincided with the World Cup Finals and for the England game on Wednesday the Festival's Pyramid Stage was used to show the football, attracting an estimated audience in excess of 80,000. For the Sunday match between England and Germany, a giant screen in the specially-created 55,000 capacity football field had been set up. Following the popularity of the

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Duncan J White is the Glastonbury Festival Project Lead Officer for Devon and Somerset Fire and Rescue Service
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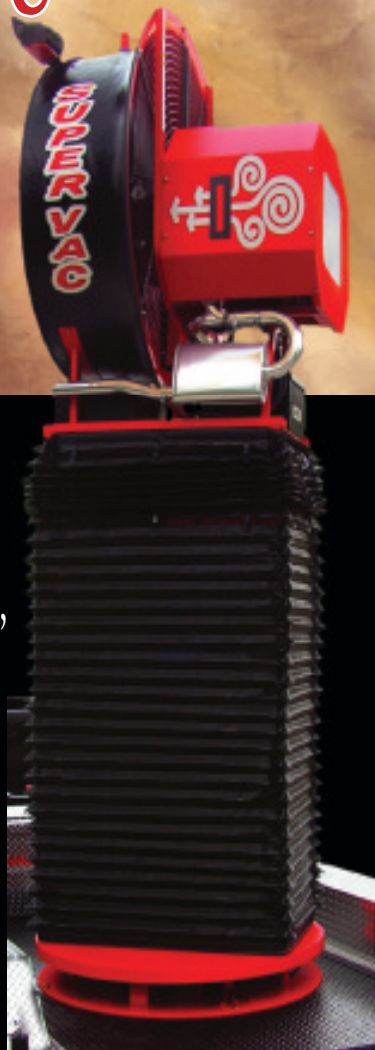
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Wednesday game an additional area with a capacity of 30,000 was highlighted and resourced.

DSFRS's Special Operations team set up its decontamination tent to the edge of the field to provide shade for festival goers suffering in the heat during the match, as the field provided no shelter from the hot sun. Even though the match was due to start at 3pm, the public started to fill the field from 1.30pm, heightening the potential risk from sun stroke and sun burn.

Community Safety Officer Chris Snook: "On the second day of the festival the weather forecast showed that temperatures would be reaching the high 20s and possibly the early 30s. Working alongside the other multi-agency partners we put in place contingency plans to deal with festival goers who potentially may suffer from heat stroke." He continued: "Following the success of the English football team on the first day, and the crowds that were watching on the Pyramid stage, the festival organisers decided that the primary football site was potentially not big enough, so they opened a second one, which appears to have been the right move as that field was full with over 30,000 fans."

"The fire service staff created a high profile presence by walking among the football supporters in uniform. The ambulance service had issued us with information on how to recognise sun-stroke and dehydration and we spent the match informing fans about the location of additional water tap sites." She added: "The way that the Service showed flexibility and willingness to support the Ambulance service at such short notice was a real credit to all DSFRS's staff."

Derek McCullough, Operations Manager for South Western Ambulance Service NHS Trust said: "The fire service communicated sun safety messages, making sure spectators were hydrated, put on their sun screen and stayed in the shade wherever possible. Working together in this way meant everyone could enjoy a safe festival."

Throughout the festival the Service demonstrated a high level of emergency response, undertaking invaluable risk reduction in the area's fire prevention, fire protection and enforcement. With rapid and relevant responses made to all emergency incidents, there were no reports of anyone being injured by fire throughout the four-day festival.

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Alcohol Resistant Foams and Viscosity

Luc Jacobs

Solberg Scandinavian AS

Today, we can fly to the moon and yet we still have problems with the mixing of pseudo-plastic foams. Luc Jacobs explains.

Every day there are issues with mixing foam at the right proportioning. Is this due to the foam? Is it due to the system? Is it due to lack of knowledge? Who does put the requirements of foam mixing in the specification when ordering a new system or fire truck?

One of the standards that lists foam concentrates and equipment is UL 162 (Foam equipment and liquid concentrates). The foam is listed in combination with a specific piece of equipment, so having a UL approval does not necessarily mean that particular piece of equipment works with any foam, or the other way around. The EU EN 1568 (Foam extinguishing media – foam concentrates), which is similar to the ISO 7203 (Fire extinguishing media – foam concentrates) will approve a foam according to a certain expansion range. In theory the user should then be able to use that foam in any equipment designed for that foam expansion. This same EN 1568 standard gives some directions on the limitations in connection to the foam concentrate viscosity.

EU EN 1568-3 tells the user that if a pseudo-plastic foam with a viscosity above 120 mPa.s (at a specific temperature and at 375 s⁻¹) or a Newtonian foam above 200 mm²/sec could need special proportioning systems. This lets us assume that below those viscosities there would not be a

Basic understanding of pseudo-plastic viscosity

Distance X Diameter (area) is the key.

Pouring (or sucking) a pseudo-plastic viscose foam through a sieve or filter is not a big issue, but sucking it up through a straw can become so difficult, that the straw collapses and closes.

For example, a pseudo-plastic AR foam can be filtered through a 25 µm sieve, but cannot run through a 1m long, 6mm diameter tube. This can be explained by the fact that the orifice is not the mixing issue, but the length and diameter of the pick-up tube is.

problem. However, in our testing, with some viscous products or at lower use temperatures (so they get close to the 120 mPa.s) we have been seeing large deviations. With some equipment configurations we noticed no foam induction at all. Even “Newtonian” products, do not always mix properly, particularly when operating temperatures are lower.

When designing a foam mixing system, a few foam types, or at best, one foam type, are used for testing. The approval and last verification is often done with water only. If we take a simple inline inductor, one could say that water will mix



From the EN 1568-3 standard:

Newtonian foam concentrates: foam concentrates that have a viscosity which is independent of the shear rate.

Pseudo-plastic foam concentrates: foam concentrates that have a viscosity which decreases with increasing shear rate.

at 6%, AFFF close to 7%, and FP close to 5%. When switching to AR type material it is even more important to keep a close check on the pressure drop over the inductor, a minimum of 30% is required (10 bar to 7 bar). Special AR type inline inductors will generate up to 50% pressure drop and are therefore generating more under-pressure to pick up the foam concentrate.

The orifice will then regulate the “proper” foam amount induced into the water flow. Often, after some years a poorly trained fire crew will have forgotten what the original configuration of nozzle, in-line inductor and foam concentrate they had. Switching equipment all the time will make them



Temperature influence

Say, you allow tolerances on the proportioning of a 3% foam concentrate of 0 percent to 30 percent (3,0% to 3,9%). You run the test and pass with 3,1% (temperature was 15°C). Next time, you run another system test and this time it is 5°C. Possibly you end up at 2.5% or lower. What now? Do you need to adjust the system?

The UL standard lists foam-equipment with a specific temperature range. EN 1568 tests at around 15°C.

vulnerable to all kinds of mixing errors. I have often seen people switching their low expanded foam branch to a medium expansion foam branch, which then suddenly operates at 4,5 bar. If the inline inductor is then designed for a 10 bar in 7 bar out low expanded foam branch, you will have problems.

Lowering the pump pressure will bring you to the required 4.5 bar nozzle pressure but that makes you unsure about the foam mixing. Typically, lowering inlet pressure (lower flow) will increase the foam mixing over the inductor. Another error is that when switching the nozzle more back-pressure can be generated, getting you below the critical 30% and not mixing any foam at all. With some equipment foam combinations will still work below the critical 30% pressure drop but this is more the exception than the rule. The good thing is that with proper knowledge and experience, one can almost always induce foam through an in-line inductor.

This example of the “simple” in-line inductor lists some of the proportioning issues; most of the same problems or obstacles can be encountered in bigger systems. Some foam manufacturers – including Solberg – developed AR multi-purpose “Newtonian” (or low viscous) foams. These foams perform on polar liquids and do not contain the special polymeric sugars which cause the pseudo-plastic properties. Still, their performance in tank fires and on polar liquids is not as good as the standard AR foams containing polysaccharides.

After listing all the issues it is time to think about the solutions. The first and most important



Key issues to use an in-line inductor with pseudo-plastic foams:

- 1 Type of foam and temperature: Viscosity (so back-pressure) will change with foam type and temperature.
- 2 Pressure drop <30% will mostly lead to lower foam pick-up or even no pick-up at all.
- 3 Inlet pressure: Typically an in-line proportioner will list an inlet pressure (often 10 bar).
- 4 Outlet pressure: Should be minimum 30% lower. Dependent on several parameters:
 - Back-pressure of the Nozzle.
 - Length of hose or elevations.
 - Flow.
 - Inlet pressure.
- 5 Flow: The concentrate mixing orifice is calculated on the water flow.
- 6 Pick-up tube: Constrictions, length, elevation.
- 7 Other parameters such as maintenance, or potential blockage of the "ball-bearing".

is training. Know your foam, equipment advantages and limitations. Secondly do not get fixed into the parameters and avoid buying fixed concentration mixing equipment, or if you do, at least be sure that the temperature influence is minor and that the foam has some performance flexibility, meaning that it works at lower and higher concentrations as listed and that the system is tested at several variable parameters and proven to mix properly.

Again the cold of winter and the heat of summer will have a bearing. Personally I favour the flexibility of foam use. Start the attack with a lower or standard concentration, increase foam mixing towards the end to make the stiff foam cover your need for burn-back and vapour suppression. Even on polar liquids one can easily start at low concentration, kill the heat, then close in, try to apply indirectly, and increase the concentration all the way up to give that strong foam blanket you need.

It is clear that I prefer a 3X6 foam, or a 1X3, if your equipment can mix as low as 1%.

Use a Flexible foam:

Even on a polar liquid, such as the new E85 car fuel, Solberg Re-Healing foam 3X6ATC, will give rapid fire control, even with lower than a 3% concentration. This heat control will allow you to approach, move in and then attack towards indirect application and increase the concentration. This will allow you, with less risk, to make that necessary, indirect application on polar liquids in a safe way.

Of course, this means that you need to calculate more foam than required – for example, 60,000 litre of 3% or 20,000 litre of 1% – but experience tells me that you will end up using more foam than was calculated. People want to be sure it foams so there is a strong temptation to increase the mixing. Inevitably in critical situations you will increase the foam mixing (even the experts do) if you do. In cases where you cannot it may mean that you will need to fight longer and hope that your foam quality is good enough to finally extinguish the fire.

Today I personally think that there is not enough direction on concentration flexibility. Standards and guidelines list minimum application rates but talk little about minimum foam concentration for initial attack, prolonged attack and final coverage for vapour suppression.

So, to finally repeat some of the points:

- Train. Know your equipment, foam concentrate and mixing issues.
- Test your equipment and measure the mixing concentration in different circumstances, temperature conditions and pressures.
- For manual application, buy flexible mixing equipment, and buy flexible foam concentrates.
- Know your equipment.
- Know your foam.
- Know the potential and optimal combinations of your foam and equipment.

IFF

Luc Jacobs is a foams expert with Solberg Scandinavian AS
www.solbergfoams.com

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The Changing Face of Fire Pump Technology



Andrew Shiner

IDEX Fire Suppression
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The effectiveness of front-line firefighting often comes down to the efficiency and reliability of the equipment being used. Andrew Shiner looks at the latest developments in one mission-critical area – fire pumps.

Firefighting is a risky business and the loss of life statistics embracing both professional firefighters and members of the public caught up in fires is enough to ensure that companies designing and building firefighting systems are constantly striving to improve the performance, versatility and reliability of front-line equipment. Fire pump manufacturers are no exception. This focused mindset is, of course, sharpened by the huge sums of money that, every year, are lost through fire damage, or spent on rebuilding fire-destroyed facilities.

When it comes to vehicle-mounted pumps, professional municipal, military and industrial firefighters around the world have never been offered

such an extensive array of high-performance options. However, what most distinguishes one manufacturer's pump from the next is how many stages are needed to generate the different pressure outputs required. For the past four decades, the accepted standard in the UK has been high flow/low pressure simultaneously with low flow/high pressure, and that combination has come about as a result of innovative pump design and the harnessing of the latest advances in mechanical and electrical engineering.

Thanks to the innovative development the universal multi-pressure pump, whereby two impellers are placed on a single shaft, Godiva became the first manufacturer to introduce a low and high

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pressure stage on a single shaft. The result was a compact installation that offered easier fitting, greater efficiency and outstanding performance.

European EN, British BS, and North American NFPA compliance standards are valuable benchmarks for assessing pump capability, and providing performance ratings based on the discharge flow and pressure. For example, 2000 litres-a-minute at 10 bar, 3000 litres-a-minute at 10 bar, 4000 litres-

a-minute at 10 bar and 6000 litres-a-minute at 10 bar.

Innovation & design

The introduction of the universal multi-pressure pump, along with the use of light alloy in the construction, saw successive Godiva pumps become standard firefighting equipment in the UK's fire and rescue service and a number of brigades in other countries from the 1960s. The advantage of using light-weight aluminium had immediate appeal in the portable pump sector where weight, portability and compactness are considerations of paramount importance. The latest in two-cylinder, air cooled engines for portable pumps were also quickly taken up as an impressive power source, and as a further means by which both weight and size could be minimised.

The drive to achieve the lowest possible installation envelope for vehicle-mounted pumps has particularly come to the fore in recent years as fire and rescue vehicles have been equipped with an ever greater variety of equipment. The equation is simple; if the pump is more compact – without, of course, jeopardising reliability – the vehicle builder can offer more space for ventilation fans, hydraulic extrication tools, thermal imaging cameras and a whole variety of other life saving and firefighting equipment.

Installation matters

The need to make pumps easier for vehicle builders to install, and provide easier access for maintenance technicians access has gone hand-in-hand with the desire to minimise the pump's footprint envelope. The addition of an integral mounting platform was a major step forward, which has several beneficial features for the builder.

As the platform is designed to suit the narrowest vehicle chassis structure, the pump can be quickly and easily secured in place. The platform also has built-in water and oil drainage taps at the front. These are linked to the bearing housing for oil replacement and pump volute for water draining, both of which are essential parts of the maintenance regime. The mounting platform is also fitted with anti-vibration mounts that help reduce noise during firefighting operations.

Avoiding any clashes with the vehicle pump bay floor structure has been achieved on the latest vehicle mounted pumps by making the suction connection project from the pump body at a shallow angle or even completely horizontal. This is also a bonus when the pump is low fitted, or when the vehicle specification calls for an increased departure angle on the vehicle bodywork.

These and other features make the pump more compact to install for the vehicle builder, and easier for the firefighter to use. Again as examples, an optional integral collecting head for hydrant feed operations is included, while multiple tank-to-pump feed points ensure that greater flexibility for pump installation.

Designers have also improved pump priming in recent years. The most up to date reciprocating piston primer systems take up less space in the

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overall design, and are more efficient and reliable when incorporating an electromagnetic clutch. The outcome is fewer moving parts to wear, less noise, lower fuel consumption and reduced emissions. The current generation of piston primer uses less water – and so is exposed to fewer abrasives – primes at a lower idling speed, and is fully automatic. They now occupy a smaller proportion of the whole pump and there is no external pipe between the suction tube and the priming mechanism.

Material selection

These days, cost, and particularly whole-life cost, is a major consideration, with buyers striving to ensure the longest possible trouble-free working life for every piece of equipment, with the lowest possible maintenance bills in terms of replacement parts and labour. Hence, pump designers use of the latest materials to ensure a long pump life, reduced maintenance costs and the most robust possible pump construction.

Today's vehicle pump uses stainless steel in the critical areas and high-grade aluminium elsewhere to boost resistance to the corrosion problems associated with deteriorating water quality and for use in corrosive industrial and marine environments. The inclusion of polymer wear rings is another feature designed to further improve the pump wear characteristics. More parts are of a modular design and important parts such as seals can be accessed in-situ without major castings being removed.

Environmental concerns are increasingly influencing the thinking of pump designers, as fire and rescue services come to terms with issues such as fuel consumption and exhaust emissions. The principal, of course, is the more efficient the pump design, the less power it will draw from the vehicle engine, so improving fuel use and reducing pollution.

Triple-pressure pumps

There is now a third option. In addition to the two-pressure discharge pump, there is now a triple-pressure pump that meets the needs of a new type of vehicle – the CARP or combined aerial rescue platform.

CARP vehicles provide the water-pumping



capability of a standard appliance with the option to use an aerial ladder. To provide water discharge at the top of the ladder, the vehicle pump has to deliver a flow of approximately 2400 litres-a-minute at 14 bar, while simultaneously supplying the hand line discharge at 1500 litres-a-minute at 6.5 bar, and the high-pressure hose reels with 400 litres-a-minute at 40 bar. An example of the type of pump that is capable of supplying these discharge pressures from one unit is the Godiva Prima Triple Pressure Range pump.

The Godiva Prima Triple range is the next generation of the tried-and-tested World Series model. It combines the existing WT low pressure centrifugal impeller and high-pressure re-regenerative impeller with a modified discharge manifold to provide the three different pressures required for CARP vehicle applications.

Another notable development of vehicle pumps is the inclusion of a Compressed Air Foam System or CAFS. This technology is being adopted increasingly by fire and rescue services as a more effective and environmentally safe method of fighting most types of combustible material fires including structural fires. An appliance equipped with CAFS comprises a high-volume air compressor of between fifty cubic-feet-a-minute and 200 cubic-feet-a-minute that is integrated with a foam proportioning system and the normal centrifugal vehicle pump.

A typical CAFS unit is the Godiva Prima with integrated SmartCAFS, a unit where all the main CAFS components are part of the pump package:



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air compressor; foam pump and mixing manifold. This compact unit is easier for vehicle builders to install and connect, as all parts are in one location instead of being distributed around the vehicle. SmartCAFS is the latest type of easy-to-use switch control for selecting wet or dry foam mixtures, and the Smart switch allows discrete increases or decreases in foam mixture across the wet to dry range and enables pre-programmed positions to be selected.

The integrated design of the Godiva Prima SmartCAFS includes safety interlocks to prevent hazardous conditions due to operator error, as well as providing for easier installation and service. CAFS has increased firefighting power, but this power is only available when all three elements: water, foam, and air are correctly utilised. The SmartCAFS Integrated System is designed to orchestrate the mixture of the three elements with minimum operator effort; a real advantage when operator training time is at a premium.

Pre-engineered pump to nozzle solution

A new concept in vehicle-mounted fire suppression that has been recently introduced is the SafeBuy system – a collaborative development between Hale and Task Force Tips. SafeBuy is a complete suppression agent delivery system comprising pump house, hoses, monitors, valves, safety devices, diagnostics and plumbing system, that is pre-engineered to work together to ensure an uninterrupted flow of suppression agent.

From the fire and rescue service's viewpoint, there is an assurance that the firefighting package is certified to perform as specified. It allows the equipment buyer to stipulate the required pump house design, and allows for standardisation of panel layout for easier pump operational training across a number of vehicles. Plumbing layouts are also consistent, so service and maintenance is easier to perform.

SafeBuy uses the Hale Qmax single-stage pump that is designed to increase the efficiency of water flow. Oversized discharge passages and additional 100mm outlet ports are designed to facilitate firefighting methods using large diameter hose.

Booster pump kit

Another new development is the high-volume booster pump kit.

This can be installed below the chassis top of frame, allowing more space for body components or additional tank capacity. This results in a lower centre of gravity, making the vehicle easier to handle and safer to operate.

The high-volume booster pump kit is ideal for a variety of fire suppression vehicles, such as tanker, small compact, rescue and midi-pumpers, as well as for rural urban interface apparatus and initial attack apparatus. The pump is equipped with the most advanced and safest pressure governor available, and features a quick pump service drop-out to ensure that repairs are fast and easy. Stainless steel plumbing and manifolds is a major boost to corrosion resistance.

IFF

Andrew Shiner is Vice President, International Sales and Marketing at IDEX Fire Suppression Group www.godiva.co.uk and www.haleproducts.com

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Specifying a Firefighting Vehicle

By Greg Richardson

Sembcorp Protection

Sembcorp Protection, which is responsible for protecting hundreds of millions of pounds worth of industrial assets on key sites in the Tees Valley on Teeside in the UK, has just boosted its arsenal of firefighting equipment with another new firefighting vehicle. Greg Richardson explains the buying process.

A firefighting vehicle is a major capital investment, whether it is destined for a municipal brigade, a civil or military airport authority or a high-hazard industrial emergency response organisation. In the case of the latest vehicle designed and built for Sembcorp, the bill came to £270,000.

Like its identical predecessor, which went into service in 2009, the new vehicle features some of world's best firefighting and chemical spill protection technology, and was designed and built to combat a set of very specific fire safety challenges. These include being capable of tackling both current and anticipated future fire scenarios, plus it has to perform alongside other equipment as part of a fully integrated and reliable fire and rescue solution.

Background to the acquisition

The specification for a new first-turnout firefighting vehicle to boost Sembcorp's emergency response capability was originally established just prior to the acquisition of a new water support vehicle in mid-2007. This is a high-capacity, fast-support unit that is fitted with the latest technology to enable the transference of water whenever and to wherever it is needed in the right quantity and at the right pressure. The unit incorporates 2,000 metres of 125mm diameter hose that is stored flat and can be deployed from the unit in a matter of minutes, enabling water to be moved quickly over long distances with minimal friction loss. The unit also has capacity for a further 2,000 metres of hose to increase the reach to 4,000 metres.



This support unit joined a high-risk environment emergency response fleet that includes two appliances – one delivers 22,701 litres-a-minute of foam or water, and the other 11,355 litres a minute. There are also four triple-agent appliances, each with a maximum pumping capacity of 4,500 litres-a-minute, and one appliance with a capacity of 10,000 litres-a-minute that holds up to 4,500 litres of AFFF foam and up to 750kg of dry powder. This is supported by 120,000 litres of foam concentrate – the largest industrial stock of foam concentrate in the UK.

Fitness for purpose

When preparing a specification, the first task is to establish as precisely as possible the threats and challenges with which the new appliance is likely to have to contend.

In this instance, the new vehicle was destined to play a leading role in safeguarding £14 billion of high-hazard chemical processing and storage assets on a number of sites on Teesside in the northeast of England. This immediately suggested a short-form specification that included high-performance systems and equipment, various types of foam proportioning, water/foam monitors, and complementary extinguishing systems such as dry powder chemical agents.

This assessment also took into account the operational experience gained from attending incidents, and the facilities already available within the existing arsenal of firefighting and support appliances. To ensure that the new vehicle would meet future emergency needs, detailed discussions also took place with Sembcorp's customers to ascertain

any significant changes that might have an impact on the current fire strategies that would need to be taken into account. Similarly, discussions were also held with existing and potential equipment suppliers to review the latest technology and imminent developments.

Shopping list

This resulted in the creation of a broad-brush "shopping list" for the new appliance. It had to:

- Be a first-turnout appliance that could deliver large volumes of water or foam for larger fires, and have the technology for large pressure and flowing fuel fires.
- Be compatible with other recently purchased Sembcorp appliances and had to offer both pump operation and equipment retrieval that was swift and user friendly.
- Incorporate a 10,000 litres-a-minute water pump supplied by four 64mm inlets and two 128mm vacuum or pressure inlets.
- Have water and foam delivery via a dosifor foam injection system through four 64mm water/foam units, two 64mm and two 128mm water-only units and a 3,800 litres-a-minute to 11,400 litres-a-minute roof monitor with the technology to extinguish three-dimensional fires involving liquids and gases under pressure.
- Have internal tank capacities of 600 litres of water, 3,000 litres of AFFF one-percent and three-percent concentrate, 250 litres of fluorine-free training foam, and 500kg of dry chemical powder, discharged via two branches that are located on either side of the appliance.

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Equipment selection

In contrast with appliances in the existing Sembcorp fleet that are either first-turnout appliances or large “pumpers”, the new unit is a versatile hybrid of both. This allows its role to be changed to reflect the firefighting demands of a developing fire. Instead of having to withdraw one appliance and replace it with another, it is necessary only to add to the water supply and increase its delivery options using the roof-mounted monitor or external monitors via 128mm outlets.

However, dependence on such versatility does mean that the chosen firefighting systems, equipment and accessories have to be of the highest uncompromising standard.

All of the equipment and firefighting agents – including the pump, tanks, the monitor, outlets, foam concentrates and chemical powder – were selected because of their proven performance in the global petrochemicals firefighting arena. Most of the equipment specified is also currently used on other Sembcorp appliances, so is familiar to the operational crews. Nevertheless, demonstrations of all of the key pieces of equipment were held to ensure that each item delivered the required performance.

For example, the particular extinguishing system was chosen because it uses the foam solution to propel the dry chemical powder agent approximately three-to-four times farther than is achievable with conventional dry chemical equipment. This gives the firefighter a safer and more efficient means of delivering the dry chemical onto the large pressure and flowing fuel fires that, potentially, Sembcorp firefighters have to face.

The technology also allows ground or spill fires to be extinguished using foam only, which harnesses

the three-dimensional fire, greatly reducing flame intensity. After this heat reduction, dry chemical is then injected into the foam stream, resulting in a more efficient extinguishing of the fire.

The tendering process

Firefighting and rescue vehicle building is a truly international business; few manufacturers are dependent upon their home market. In this instance five companies were approached – two British, one American, one German and one French – all of which met Sembcorp’s baseline design and manufacturing capabilities requirements.

Two companies were short-listed before the final selection was made; both were inspected and the people who would be

responsible for the completion of the project were met and assessed.

While the vehicle design utilises a conventional commercial chassis, the superstructure of the vehicle was custom-built and all of the components were to Sembcorp’s specific requirements. This inevitably caused occasional delays. However, the builder’s experience in building one-off firefighting trucks, the way in which the factory is set up for built-to-order production and the professional way in which the company does business kept these to a minimum. Issues did occasionally arise over interpretation of Sembcorp’s specification, so a degree of flexibility regarding delivery times and a contingency for minor changes are sensible precautions. Again though, these were minimised by building into the programme formal site visit meetings at the pre-build, intermediate build and commissioning stages.

In the event, the initial project took two years to complete from specification to delivery. The chassis was ordered in April 2007, was delivered to the builder in February 2008, and the first commissioned vehicle was finally placed “on run” in Teesside in January 2009. The latest engine entered Sembcorp’s service earlier this year. **IFF**



Greg Richardson is Engineering & Technical Manager at Sembcorp Protection
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Are You Prepared For a Structural Collapse Response?



By Lori Peace

Texas Engineering
Extension Service

Waiting until a structural collapse occurs is a recipe for turning a disaster into a catastrophe as Lori Peace, Associate Training Specialist in the Weapons of Mass Destruction Defensive Operations Program at TEEX, explains.

Structural collapses resulting from earthquakes have gained a great deal of media coverage and have been a challenge for rescuers worldwide due to the amount of devastation and the number of resources required to affect a competent response. Many of us believe that since we do not work in an area known for seismic activity that we will not encounter a structural collapse of any significance. From small towns to large metropolitan areas, response crews in recent years have had their resources quickly overwhelmed by both natural and man-made situations that have resulted in structural collapse. Government buildings, residential buildings, shopping centres, sports arenas, schools, airport terminals, subway systems,

bridges and many other structures have collapsed.

Responding to a structural collapse is a high risk activity that we could encounter at any moment. Are we prepared for this type of response? Do we understand enough about the discipline to avoid making mistakes that will endanger more people, including our firefighters?

Response to structural collapse includes exposure to unique hazards for which we are not trained in our basic firefighter classes and is a separate specialty discipline that requires a great deal of training. From using specialised equipment to recognition of special hazards, even working as support to a structural collapse team carries with it risks that can jeopardise the operation. Training

STRUCTURAL COLLAPSE

Pic courtesy the United Nations Development Programme



personnel and maintaining enough equipment for an appropriate response to structural collapse can be difficult, especially since structural collapse is not a daily occurrence in most jurisdictions.

Some areas have opted to form regional response teams in an effort to pool resources and share training expenses. Even with the formation of special teams, every firefighter should become familiar – at least to the awareness level – with structural collapse response methods.

An effective response to a structural collapse includes an interesting blend of many disciplines. Knowledge of the basics – such as SCBA use,

in permit-required confined spaces, and the operation of heavy rescue tools, including a variety of pneumatic, hydraulic, electric and hand tools.

Understanding how to work safely in close proximity to cranes, loaders, conveyors, dump trucks and backhoes is essential. When establishing an action plan for search and rescue, the involvement of rescuers who have extensive knowledge of building construction, construction materials, plus the involvement of structural engineers will help form the safest plan.

With this in mind, like other emergency responses, structural collapse is something that

Responding to a structural collapse is a high risk activity that you could encounter at any moment. Are you prepared for this type of response? Do you understand enough about the discipline to avoid making mistakes that will endanger more people, including your firefighters?

personal protective equipment, incident command, safety and hazardous materials operations – is essential. But structural collapse is so complex that it includes elements of trench rescue, including shoring and stabilisation techniques, operation of electronic search devices, such as acoustic monitoring, fibre-optic telescoping cameras, seismic monitors, and thermal imaging cameras. It also calls for proficiency in rope rescue techniques for raising or lowering rescuers or victims who have been packaged into a basket or sked, medical training so that victims can be stabilised, performing safe operations

requires a written plan, memorandums of understanding with private local resources, and some degree of training for all personnel. As you would expect, if command can be set up quickly, perimeter controls established, and evaluation and organisation occurs quickly, it will positively affect the remainder of the response by providing a sound structure into which incoming resources can successfully merge. Additionally, these types of dramatic events attract a great deal of attention. Well-intentioned civilians will rapidly enter the area to help victims, which can lead to additional



collapses, more victims, exposure to multiple hazards and can create a safety hazard for response personnel. Firm control of the perimeter early in the response can help prevent the response from becoming an out-of-control, dangerous situation.

There are many standard operating procedures and job performance requirements that have been written concerning the appropriate actions to take during response to a structural collapse. NFPA 1006 [Standard for Technical Rescuer Professional Qualifications] addresses many of the essential objectives a rescue technician should be capable of achieving during such an event. What guidelines exist in your department? What areas of expertise exist within your department? How can your personnel assist technicians who will be arriving? Pre-planning and training together with all potential responders for an event of this nature is necessary. It builds confidence within your department and can reveal weaknesses in the plan that can be resolved prior to a collapse.

Causes of collapse and a few examples

General reasons for structural collapse include ground instability – for example, excavation and rain – poor construction methods, poor workmanship, faulty materials, structural defects, ignorance of or illegal construction, disregarding building codes, structural vibrations such as earthquakes, accidental or intentional explosions, vehicular impact with wall supports, ice loading on the roof or other loading matters just to name a few.

Situations that are naturally occurring events, such as earthquakes, are a significant source of building collapses. There are examples from Chengdu in China, Kobe in Japan, and Taiwan to the Caribbean nation of Haiti that illustrate the

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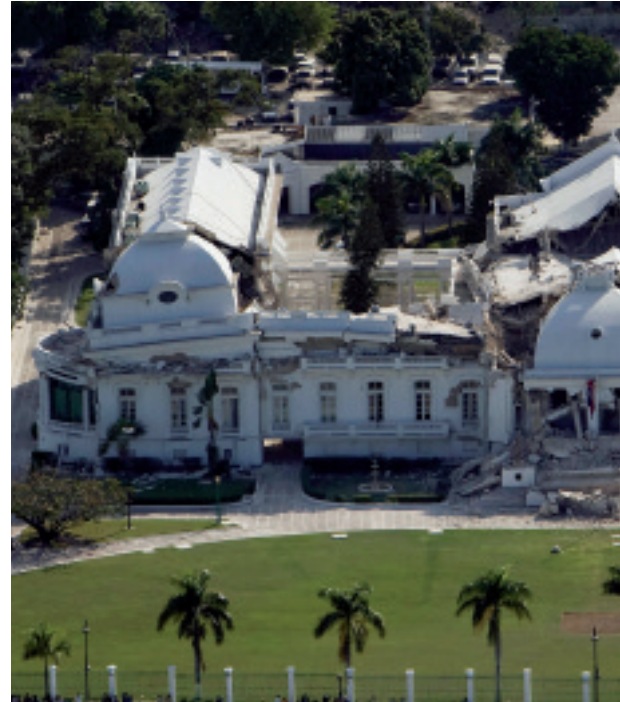
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STRUCTURAL COLLAPSE

destructive forces involved during an earthquake and its aftershocks. The Kobe earthquake caused the collapse in the Daikai subway station, which was constructed of reinforced concrete.

Other collapses due to nature involve the build-up of snow on roofs. Snow build-up stresses loading and has been named a contributing factor in the collapse of roofs in Moscow and Chusovoy in Russia, in Katowice in Poland, in Bad Reichenhall in Germany, and many other areas throughout the years.

Actions – or inactions – by humans are also responsible for a number of structural collapses. Poor building construction, poor building materials, or poor building standards have been blamed in a number of building collapses. In 2008, unreinforced concrete used in the construction of schools in Haiti was blamed for the collapse of two schools that resulted in the death of around 150 people, mostly schoolchildren. These two



Pic courtesy the United Nations Development Programme

separate collapses occurred without any apparent additional stressors. A boarding school in disrepair collapsed in a Tichakpura in India killing 11 girls in January of 2007. Lagos in Nigeria has experienced a number of collapses with one notable collapse in 2006 resulting in around 25 deaths. And one of the largest disasters in South Korea occurred in Seoul in 1995 when over 500 deaths and more than 900 injuries resulted from the collapse of a building in which inappropriate construction for the intended load was suspected. In Cologne in Germany, subway excavation in a nearby area is suspected to have been a factor in the collapse of the historical archives building in 2009.

Events that challenge the intended loading of structures can also lead to collapse. Many concert-goers dancing to the rhythm of music in Abbotsford in British Columbia found themselves falling through the floor as it collapsed in April 2008, injuring around 40 people. Vehicle accidents can damage load bearing elements. In December 2007, a motorist in a parking garage crashed into the structure at a shopping mall in North Carolina. That occurrence is suspected of causing the collapse of a portion of the parking area.

Unusual incidences, such as the 1999 collapse of the Texas A & M bonfire can pose a challenge to fire and rescue crews because it is difficult to predict the results of actions taken due to the unique nature of the building methods. This particular bonfire, built primarily by students at Texas A & M University was under construction; about 12 metres high and consisted of around 5000 logs placed vertically and wired in place when it collapsed. Twelve people were killed and around 30 were injured.

Of special note is the possibility that an intentional act caused the structural collapse. The provision of scene safety is at the top of everyone's list and is one of the objectives that may require examination from a different perspective. In today's environment, one must consider the possi-

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bility that the collapse was deliberate. Working hand in hand with the scene survey and size-up of the situation, take the opportunity to evaluate the entire situation from a more suspicious viewpoint.

The inventiveness of terrorist organisations never ceases, and terrorist organisations utilise any tactic to accomplish their goals. One of the primary tools of terrorists is explosive devices. Learn about the structure and its purpose. Who are the occupants of the structure and what events are taking place within that structure? Take a very close look at the damage you see. Could it have been caused by a Vehicle Borne Improvised Explosive Device [VBIED], a suicide bomber, or explosives targeting load-bearing building components? If the incident appears to be a deliberate event, consider additional threats to your personnel. Could additional devices be present? Are the types of injuries or symptoms observed in victims consistent with those present at a structural collapse? Could chemical, biological or nuclear materials have been released in the area? If intentional acts are suspected, take appropriate measures to assure continued safety of all response personnel. Law enforcement will take measures to secure the scene, preserve the scene and collect evidence.

Buildings and subways have been the subject of terrorist bombings. The Moscow Metro suffered due to suicide bombings in March of 2010, London Underground was targeted in 2005, and additional attacks can be expected. There has been some research concerning the stability of subway tunnels in reaction to internal explosive events and, hopefully, this research will lead to improved construction methods that will further limit the possibility of collapse.

Political targets, such as marine barracks in Beirut in Lebanon, the Murrah Building in Oklahoma City and the US Embassy buildings in Dar es Salaam in Tanzania and Nairobi in Kenya have been the focus of terrorist bombings. Even buildings that do not have obvious political ties, such as apartment buildings in the Russian cities of

Moscow, Buynaksk and Volgodonsk, the World Trade Centre buildings in New York, and apartment buildings in Riyadh in Saudi Arabia have succumbed to terrorist bombings. Any type of occupancy could become the target of a terrorist bombing. Public houses, apartments, night clubs, restaurants, hospitals, and basically any place that people gather, as is proven by explosions from Uganda to Great Britain to Bali.

Only an acute eye and good evaluation skills can identify intentional bombings and take actions to protect firefighters from potential additional devices or releases intended to prevent firefighters from rescuing victims. With causes of structural collapses ranging from acts of Mother Nature to acts of mankind, these examples prove that structural collapse occurs in a variety of locations, and yield many seriously injured victims. There is no inhabited environment that is not susceptible to structural collapse.



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Hazards to firefighters abound at a structural collapse scene. In addition to the standard safety considerations that exist at a typical fire response, such as live electrical hazards, gas or liquid releases, structural collapse offers many more. Even your vehicles, equipment or personnel movement could cause vibrations that may aggravate the situation. Utilising specialists to supplement your response can provide essential measures of safety for your personnel.

Meteorologists, seismologists, structural engineers, soil analysts, transit authorities, or heavy equipment operators can provide information that can help formulate a sound strategy. Specialists can offer assistance in recognising and preparing for aftershocks, monitoring for vibrations, anticipation of movement of structural elements, monitoring any widening of fissures, inspecting shoring and stability of remaining structural elements, monitoring of air quality, predicting additional rainfall that may further destabilise soil, anticipate settlement of debris, and provide general observations in their field of expertise that may cause a better outcome for the response and allow for maximum safety in a high-risk response environment.

When performing pre-planning safety inspections of structures in your jurisdiction, evaluate the construction methods, consider the types of collapses that can occur and how safe access could be gained. Consider staging locations where personnel and equipment would not interfere with structural stability, evaluate equipment that could produce vibrations or disturb collapsed structures, the ground, or anything in the area. Look for natural barriers that could serve as a perimeter. Ensure contact information is current so that subway, air traffic or vehicular traffic can be halted if it might endanger the operation.

Structural collapse rescue is multifaceted and requires a high degree of specialised training. Guesswork or randomly shoring or placing air bags is not the answer. Alerting firefighters to the dangers of structural collapse response and raising awareness of the discipline will hopefully help departments understand the need for training and planning for collapses. First steps could include something as simple as conducting a refresher course utilising basic fire training course materials to recall collapse patterns and areas where victims can be sheltered within the collapse.

Many may believe that if a collapse occurs in your jurisdiction right now, you may be in over your head and will not be able to recover. Remember that even smaller departments without a number of resources could have some type of specialty or expertise that could offer support to structural collapse response crews. Start now evaluating what risks exist in your area, what resources you could utilise locally – consider colleges, universities, and construction companies – and seek to find firefighters with a high aptitude for building construction and an interest in structural collapse. Since response to structural collapse is rare and response is quite specialised, even a structural collapse awareness class may provide information that could save your life and provide for a better, more confident initial response. **IFF**

Lori Peace is Associate Training Specialist in the Weapons of Mass Destruction Defensive Operations Program at Texas Engineering Extension Service www.teex.com

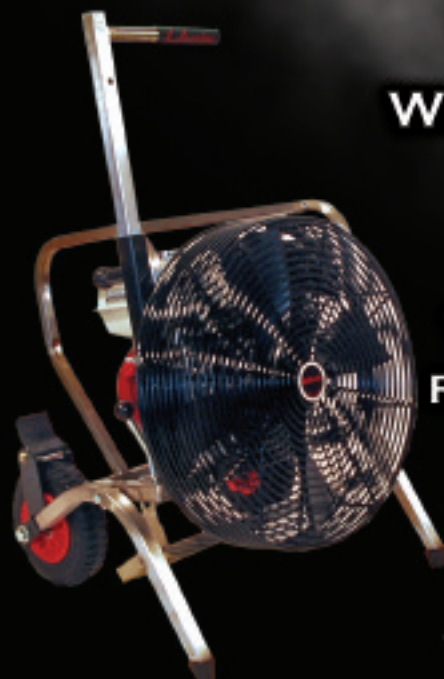
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Why Confined Space

This photograph shows a series of confined spaces on top of a grain elevator that is between 15 metres and 18 metres above ground. Access to the confined space is limited by narrow catwalks that are accessible from inside the elevator; no direct access is feasible from the inside. Staging equipment will be a difficult challenge as well as removing the victim from the space and lowering him or her to the ground



By Mark van der Feyst

Fire Star Training Services

Confined space rescue is a risky endeavour rescue attempts sometimes fail, as fail as Mark van der Feyst explains.

Conducting a confined space rescue is a risky endeavour that requires great skill and patience. Many times we have seen numerous rescue attempts fail due to a lack of patience and skill being exercised by rescue personnel. In the training of technical rescue operations, we provide instruction on how to avoid a failed rescue attempt by recognising certain factors that are leading to the overall situation. The acronym FAILURE is used to describe the factors that can be present at each confined space rescue operation.

The acronym FAILURE stands for:

- F** – Failure to understand the environment.
- A** – Additional medical implications not considered, such as dust and crush syndrome.
- I** – Inadequate preparation.
- L** – Lack of team work and training.
- U** – Underestimating the logistical needs.
- R** – Rescue vs. recovery.
- E** – Equipment not mastered.

Let us look at the first letter in detail to see how it leads to the overall failure of a rescue attempt. The first letter is F, is describing the failure to understand the environment. This encompasses a few different perspectives on how the environment can lead to the overall failure.

First, let us consider temperature extremes, which can bring us either heat-related or cold-related type of injuries while we are conducting a confined space rescue. Heat stress is a common injury sustained by many rescuers, and this can be

generated by different sources: directly from the sun; ambient heat conditions; or by equipment generating heat. Most confined spaces will be hot and humid as there is very little air flow or none at all.

The rise in temperature inside the space as well as the temperature outside the space will have a significant impact on the rescue team. Confined spaces that are located outdoors will have the sun directly impacting upon the heat inside the space. Heat can also be generated by the personnel inside the space, as body heat can account for the ambient heat conditions. Rescue personnel wearing chemical protective clothing will have a greater exposure to heat stress; being totally encapsulated in a plastic shell will increase the metabolic heat factor of the rescuer and will limit their time in operation. Careful attention must be paid to monitoring the amount of time a rescuer spends inside the confined space. Adequate time to rehabilitate will be needed in order to cycle rescue personnel through the operation.

Equipment or processes can generate large volumes of heat, and these must be identified and controlled in order to alleviate the hazard from contributing to the heat stress factor. Sometimes this cannot be eliminated due to technical/industrial reasons. If this is the case, then managing the exposure to the heat will be necessary.

On the other hand, some confined spaces are

Rescues Can Fail

damp, wet and very cold and can lead to hypothermic states, which will be particularly dangerous for victim inside the confined space. For the rescuers, being exposed to extreme cold will limit their endurance and dexterity. Fortunately with a cold environment we can possibly introduce warmth by various methods to aid in the recovery of the victim, whereas with a hot confined space, we are not able to reduce the temperature by introducing air conditioning.

Another aspect of failing to understand the environment is in regard to the topography of the land or the work surfaces available. Confined space rescues that occur inside a building are going to have work surfaces that vary in type, flatness, size and height. These differing surfaces will present us with a challenge, and failing to understand or identify them may lead to the overall failure. Such surfaces may be slippery due to dust or water on the floor; they may be cluttered with debris, and restricted in height or size. Another environmental factor is obstacles around the work site. Many industrial sites abound with process pipes, electrical conduit trays, steam lines, water lines, and conveyor lines. These obstacles will prohibit rescuers from engaging effectively.

The topography of the land will be an important factor to consider when dealing with a confined space rescue outdoors. The slope of the land will lead to the equipment being able to be used in either a full or partial capacity; the land or soil content around the confined space may be solid or loose, it may be saturated with water or muddy – all will have an impact on the operation as a whole and rescue equipment may have to be adapted to compensate for the surface conditions.

Other considerations include differing elevations and access to the confined space. Some confined spaces are not easily accessible and will present a multitude of challenges trying to access them. Setting up specialised equipment will be difficult with restricted



This photograph shows the outside of the grain elevator. Again, notice the height and the obstacles above the confined spaces. The access points are limited by narrow catwalks, which are entered by the main building

access, as well as gathering manpower for the rescue operation. The difference in height from the confined space to the catwalk or access points will also contribute to the challenge, with transporting equipment up the required elevation being the biggest obstacle. Transporting the victim, once extricated from the space, will undoubtedly be the next obstacle.

So, the environment must be evaluated and understood in order for our rescue operations to be a success. Not taking the time to understand the facts that are presented to us at the size-up phase of the rescue operations will certainly lead to the overall failure of the operation.

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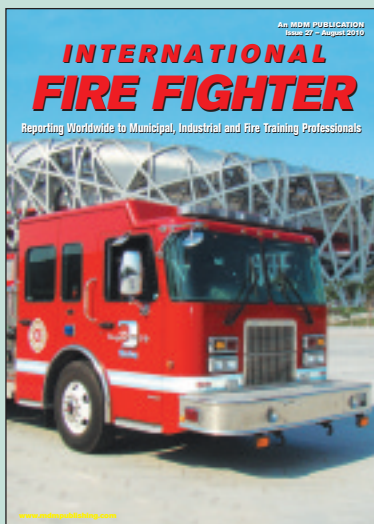
This confined space here is the grey square in the corner of the photograph. The only access point is from above, where the yellow step ladder is positioned. It is congested with many overhead and ground level obstructions. Also, notice the wet surface of the floor

Mark van der Feyst is an instructor with Fire Star Training Services
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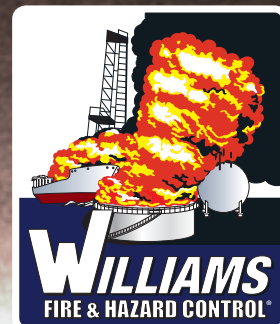
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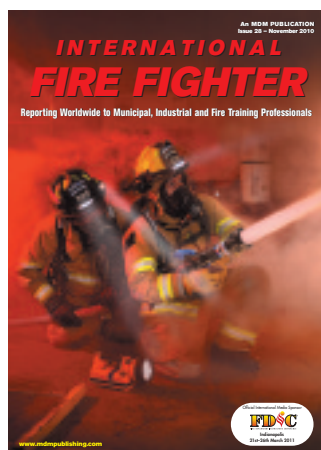


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Publishers

David Staddon & Mark Seton

Sales Manager

Mark Bathard

Group Editor

Graham Collins

Contributing Editors

Niilo Alakopsa, Javier Fernandez, Mark van der Feyst, Tom Guldner, Ian Hutcheson, Spencer Michelsen, Jimmy Säfström, Gregory Sobole Jr., Roger Weinmeister, Paul Gibson

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By Graham Collins

Moving On

I recently came across a somewhat crumpled old black-and-white photograph. It showed a great-uncle of mine in the months before he was called up for military service in the 1939 – 1945 world war. In the photograph, great-uncle Ron is clearly proud and resplendent in his auxiliary fireman's uniform; a sharp reminder of how far we have come in terms of protecting firefighters with effective personal protection equipment.

His "protection" comprised virtually nothing. Certainly his clothing offered little protection, his helmet was clearly a battered relic of the 1914 – 1918 conflict, and the only vestige of equipment was his axe. Equipped with this wholly inadequate protection he – like hundreds alongside him – risked life and limb during the blitz on London, Coventry and other major cities throughout the UK. His and his fellow firefighters' courage, resilience and dedication, which was no doubt mirrored in cities across war-torn Europe, can now be only marvelled at.

70 years on things have, thankfully, changed and the sophistication of the technology and investment in research and development have resulted in major strides being made in firefighters' personal protection equipment. So, in this edition of International Fire Fighter we take a close look at the latest in limited-life and re-usable high-hazard protective clothing and the way in which specialised industrial protective clothing has developed.

This edition also takes a close look at fire-fighting and rescue equipment, including a

comprehensive review of hose retrieval gear, an overview of positive pressure ventilation equipment and a run-down on the various types of lifting bags on the market. On the training side we have a firefighter's view on the benefits of simulation training and an article on offshore survival training, plus there is an interesting article on rope rescue techniques.

However, while some developments take years or even decades to come to fruition, others are alarmingly quick and have the capacity to take us by surprise. It is only months since a devastating earthquake struck the Caribbean island of Haiti yet, as this edition of International Fire Fighter goes to press, we learn that tragedy has been heaped on disaster with the outbreak of cholera. Even more recently, another tsunami has struck Indonesia, killing hundreds and leaving thousands homeless.

The global fire and rescue community's reaction to these and other natural disasters has been its customary prompt, professional and unstinting response, the plus side of which is that responders are acquiring a vast amount of invaluable hands-on experience, which we hope to share with readers. We may, hopefully, be learning how to predict, if not prevent, these disasters, work towards having the resources and skills in place "on the ground" for faster response, and learn how to construct buildings that take account of the disasters that are most likely to strike.

These are subjects that we will be addressing in the pages of International Fire Fighter throughout 2011.

IFF



The End Of The Hose

Rescue work in damaged or destroyed buildings is difficult and time-consuming. Now, new eDRAULIC-technology offers evident advantages for faster rescuing of trapped casualties.

Until now, the work of emergency response teams has been hampered by their equipment's dependence on power units and hoses. However, thanks to eDRAULIC tools, explosion, earthquake and natural disaster rescue teams now have the opportunity for greater flexibility and mobility even in the most inaccessible locations.

eDRAULIC tools are independent from power units. They provide unrivalled flexibility, enabling rescue operations to be carried out exactly where people are trapped and not, as in the past, at wherever the power unit was at that particular time. The operating range is not limited by the length of heavy and bulky hose. Even so, the eDRAULIC series from LUKAS offers the same performance as the latest generation of rescue tools driven by power units – but powered by a single battery. Cutters, spreaders and rescue rams all use the same type of battery, whether being called upon to stabilise, lift or remove obstacles that weigh several tonnes. Accessibility is simply no longer a limiting factor.

These latest tools were put to the test against the ultra-high-strength steel used in the latest generation of luxury vehicles during the annual training event, called "Challenge", for fire brigades and rescue services held in Hamm, Germany. Perhaps not surprisingly though, before the duel, many participants were somewhat sceptical. The question many asked was: "Can electrically-driven rescue equipment possibly match the performance of the latest generation of rescue tools driven by power units, particularly when the power comes from a single battery?"

The first proof came at the moderated cutting demonstration, which put the most serious doubts to rest. While both cable and battery-operated tools matched all of the challenges of modern vehicle construction and materials, delegates to the training event soon got a close look at the impressive additional advantages of eDRAULIC.

They saw that eDRAULIC tools meant rescue right away and without set-up. The scenario created by the training instructors was a parking garage where some teenagers lost control of their



vehicle and broke through the railing. This left the vehicle hanging dangerously over the edge of the first floor. The accident scene could only be reached through a stairway, so hand-carrying power units and hoses upstairs would have taken too much time and effort. However, equipped with eDRAULIC tools, the rescuers reacted immediately. They were able to begin extricating the victims right away, without worrying about hose lengths or setting up power units. The rescuers mastered the situation with cutters, spreaders and rams from the eDRAULIC series.

The participants were also enthusiastic about the way how hose-free tools worked in other scenarios, making the rescue operation easier, more flexible and faster. Given such a convincing performance by the eDRAULIC tools in practice, there was only one question on their lips: "Who still needs hoses?"

But the training event was not all hands-on; first came the theory. Via presentations and supervised cutting demonstrations, the delegates learned about new sources of danger for rescuers and trapped casualties, the characteristics of the high-strength steel used in modern vehicle construction, and the increasing number of safety systems built into modern vehicle bodies. Finally, their enthusiasm for the new equipment was further boosted when they had the opportunity to demonstrate their new knowledge in realistic rescue scenarios.

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UK Firefighter Gets President's Award

An award established after 9/11 to honour volunteers who give hundreds of thousands of hours a year helping others – believed to be one of only very few awards presented to individuals outside of America – has been awarded to UK firefighter, MARK MILLINGTON. He was presented with *The President's Call to Service Award* for 4,000 or more hours of volunteer service.

Mark got involved with the *Gear Up Foundation*, which was established after 9/11 to distribute decommissioned uniforms and equipment to fire services worldwide, when he attended the first commemorative ceremony on behalf of firefighters from Nottinghamshire and across the UK. It inspired him to set up a UK wing of the Foundation.

Since then Mark, a Watch Manager with the Nottingham Fire & Rescue Service, has organised the collection and distribution of equipment from the UK to locations as far afield as Ecuador, Bolivia and the Philippines.

Commenting on the award, Nottinghamshire's Chief Fire Officer, Frank Swann says: "Mark is dedicated to the *Gear Up Foundation* and this award is a reflection of all his hard work over the years. I'm really pleased our Service is able to support *Gear Up* and see our kit being sent off to a useful second life. We hope it makes our colleagues safer in their jobs, as well as saving more lives in the process."

For more information go to www.gearupfoundation.org



Blowing In The Wind



A new fan weighing just 20 kg has been introduced by RAMFAN. The LG200 PPV Turbo Blower is cited as generating 20,000 m²/hr with 56 percent less carbon monoxide than comparable gas-powered ventilation fans. It designed to be carried one-handed anywhere on the fireground, even to upper floors in a high-rise buildings

The LG200's performance is the result of an ultra-compact, two-hp Honda engine that features 50 percent greater air intake and Ramfan's PowerShroud™ technology; a combination of fan and stationary blades that turn spinning airflow into a straight, tightly-focused blast of air.

For more information go to www.euramcosafety.com

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Scottish Firefighters Have Major Incident Support



A purpose-designed Environmental Protection Unit has been delivered to STRATHCLYDE FIRE & RESCUE SERVICE to assist expert scientists advising Scottish firefighters at the scenes of major chemical, biological, radiological or nuclear contamination incidents. The appliance is based at Strathclyde Fire Service headquarters in Hamilton, from where it is in readiness to attend incidents across Scotland.

The new unit allows experts to carry out their vital test and analysis work at the scene of an incident, and report directly to the incident commander on the ground, saving crucial time when dealing with potentially

dangerous situations. It is split into two compartments: one is a cutting-edge laboratory kitted out with an array of high-technology instruments and computers; the other serves as a command and communications centre. Both are equipped with internal and external CCTV cameras.

At 15 tonnes, the new Mercedes-Benz Atego unit is lighter and more manoeuvrable than the 18-tonne truck it has replaced, is less expensive to buy and more economical to run.

For more information go to www.strathclydefire.org

New Remote Area Lighting System



A new remote area lighting system has been unveiled by PELI PRODUCTS' Advanced Area Lighting Group. The 9430SL remote area lighting system (RALS) is a spotlight version of the powerful, compact and portable 9430 RALS.

The 9430SL features an LED array with a tightly-focused ten degree light that illuminates 183 meters. With 24 latest-generation LEDs and a dual power mode and waterproof switch, it beams 2,000 lumens in high mode and 1,000 lumens in low mode. Powered by a self-contained, maintenance-free, rechargeable battery, the system offers up to eight hours of peak brightness and 15 hours of total run time.

It features a 360 degree swivelling telescope mast that extends to 820mm and a wide area handle for easy gloved grip and handling. With extremely durable, water-resistant, polymer construction, the 9430SL spot light is available in black. Also available is the 9430IR with infrared light output for use with night vision systems and the 9430 RALS for all-purpose, darkness-destroying, area lighting.

For more information go to www.peli.com/en/content/9430-rals

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before

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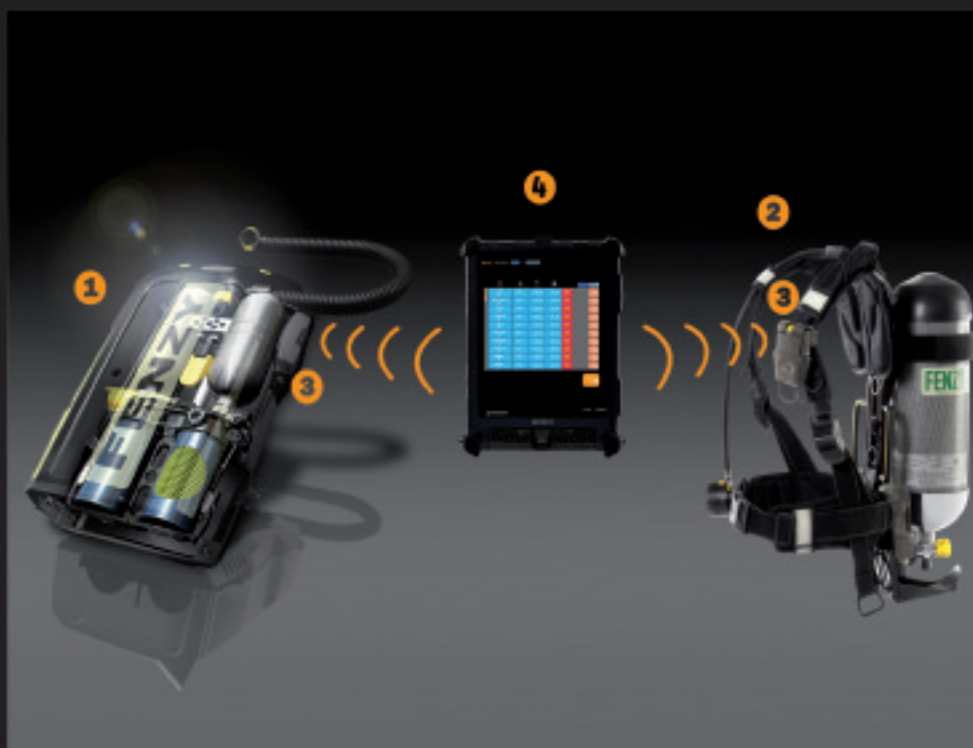
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Hot Training For Gra



Roaring flames, belching smoke and oppressive heat would test the bravest soul. Most people would be running away from the scene – but this is the harsh reality that brave firefighters face every day. And that is why Grampian Fire and Rescue Service has just recently opened Scotland's state-of-the-art training block facility.

Over recent years, the number of fires has been steadily reducing, yet as fires reduce, other kinds of emergency incidents are on the rise. Now, according to the Grampian's Development Centre's Station Manager, Graeme Goonan, a recently opened facility is where Grampian's firefighters will train, providing them with real fire situational awareness and the realistic training that is essential for firefighter safety, confidence and competence.

Not so many years ago, the incidence of fire in the home and elsewhere was such that firefighters were regularly exposed to real events, with very real effects. Following years of positive community fire safety information, highly visible fire safety initiatives and recent legislation changes, fires are continuing to reduce. So it becomes increasingly important to ensure that firefighters are properly trained and given experience of real fire conditions.

In a real fire, temperatures can exceed 1,000°C; water becomes scalding superheated steam; visibility is zero; noise is deafening; personal protective equipment (PPE) such as fire kit and breathing apparatus makes unnatural, dehydration and overheating combine to make even thinking difficult. These are situations almost impossible to

describe to those who have not experienced it for themselves, so the ability to take trainees out of the theory and into a realistic environment, to train staff in these extreme conditions in controllable, measureable and manageable ways, is essential.

The hot fire units use burning wood to replicate the conditions of real fires. In the units, where temperatures can reach around 800°C, firefighters get a feel for what to expect in a real emergency and gain first-hand experience of what really happens when a fire is attacked. The three-storey complex will put firefighters face to face with real life scenarios where fires can be created in a controlled environment that range from a small domestic apartment, to a large office or multi-storey tower block, a high rise office or ship interior.

Training firefighters in these conditions will also get them familiar with and confident to tackle various fire conditions, such as flashover and back-draft, and because the new facility has numerous entry points – bottom, middle and top – no two exercises need ever be the same. The exercises can simulate a fire in a basement, high-rise building, house or garage. Entry can be via a staircase, ladder, window or platform. In total, there are around a dozen different entry points,

For more information go to
www.transitionalfire.com
 and www.grampianfrs.org.uk

mpian Firefighters



22 different interconnected compartments and 23 interior doors that can be fixed, open or closed, locked or unlocked.

Safety is paramount, and the unit has a network of sensors that continually monitor temperature during exercises, plus the Centre's experienced instructors are present throughout every exercise. Should the already intense conditions during exercise start to become extreme, audible and visible alarms will activate to inform instructors to regulate the conditions. The compartments can be heat, smoke and fumes ventilated in seconds, if the conditions require that level of control.

The training provided within the live fire facility is as real as it gets outside of an actual incident and is the most effective way to develop staff to operate safely in realistic conditions.

"Sectorisation" is a bit of fire service jargon that basically it means the division of a larger scale incident into smaller more manageable areas. So the unit is large enough to allow several teams to participate in the same large-scale – up to six pumps – simulation involving sector commanders and the overall incident commander.

The purchase and installation of the new multi-trainer unit was the culmination of twelve months of planning and six months construction work and represents a major investment and upgrade of the service's operational training centre

site at Schoolhill Portlethen on the outskirts of Aberdeen City, which has been used to deliver real fire training to operational staff for over 15 years. A major groundwork's and drainage project was awarded to local contractor, Ennstone Thistle, to extend and prepare the training site, and the manufacture and installation of the steel compartmented training unit was contracted to Transitional Fire Ltd.

The service's investment in these state of the art training facilities was fully supported by the local Joint Board members who have governing responsibility for the fire and rescue services and was officially opened on 28 July 2010. The instruction and support staff based at the development centre were keen supporters of the new facility and have been busy preparing a range of new training scenarios matched to the unit's capability to ensure that the service's 800 operational staff continue to receive the very best risk-critical training for their role.

In addition to providing training for their own staff, the service is currently using their experience to assist with a national project to develop a common standard for real fire training across for the eight Scottish fire and rescue services.

Mike Dickson, the operational training manager says: "Our service is fully behind the concept that operational staff should have access to risk-critical training that prepares them for the risks and hazards they may one day have to face. The service's investment in the new facility ensures that we can continue to meet this expectation both now and well into the future. The training provided within the live fire facility by qualified instructors is as real as it gets outside of an actual incident and is the most effective way to develop our staff to operate safely in realistic conditions."

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Skedco – Committed To Serve

Born in the Montana high country, the SKED® Litter originally transported game from the mountain fields to the dinner table. Today, the SKED Litter takes on a new and more important mission – transporting the nation's wounded from the world's battlefields to the surgeon's table.

In 1981, Carston (Bud) Calkin and his wife Catherine incorporated Skedco as an Oregon C corporation, opening for business in 1982 with the first-ever combat-casualty evacuation (CASEVAC) kit, the SKED Basic Rescue and Transport System. The patented system – designed, developed and manufactured exclusively by Skedco for military and professional medical-rescue applications – was the first in what would become an extensive line of state-of-the-art casualty evacuation and rescue systems.

Skedco now markets over 200 products, including the Personal bailout kit with Skedco's new window anchor, the TerrAdaptor™ multipod, Sked Stretchers with Cobra side release aluminium buckles and Cobra buckle kits to retrofit Skeds that are currently in use.

Skedco products did not gain immediate acceptance throughout the military. Skedco's corporate tenacity combined with extensive new equipment and training and continued product development finally sparked the Army's interest. Skedco products underwent 18 months of rigorous military field testing and evaluation that culminated in Skedco's initial line receiving the seal of standardisation.

Today Skedco occupies a newly constructed, 1,700 square metre manufacturing centre in Tualatin, Oregon, where it continues to manufacture the highest quality "extreme" medical and rescue products. Skedco's design and development capabilities continue to grow, expanding into air and crash-worthy strap technologies, increasing life support and precious-cargo retention.

One of the Skedco's biggest customers is the U.S. Army, for which it provides continued mission support through its extensive military product line, several components of which are standardized subcomponents of Army medical sets, kits and outfits. Nonstandard products fill interim capability gaps, allowing units to perform their missions effectively today and into the future.

Skedco has an unwavering commitment to serve customers by going the extra mile to ensure that their requirements are met. This commitment goes beyond supplying products on time; it continues by providing hands-on new equipment training and product support anywhere, anytime.

Skedco maintains constant vigilance on the problems soldiers face today. At short notice, Skedco can deploy a problem resolution team, bringing forward the technologies of Skedco and its affiliates to overcome adversity.

Among Skedco's industry leading successes are:

- 2007-08: U.S. Army Medical Research and Material Command awarded Skedco the contract to manufacture the soldier-designed



Field Expedient Bleeding Simulation System™, a revolutionary bleeding simulation system that brings realism to tactical combat casualty-care training.

- 2006-07: U.S. Army and Marine Corps Special Operations Commands selected the Skedco Combat CASEVAC Kit, SOF Mobility as its interim operational CASEVAC kit for their mine resistant ambush protected fleet of vehicles.
- 2002: PEO Aviation, Utility Helicopter Project Office contracted Skedco to design, develop and manufacture a new system of helicopter medical bags for the Army's fleet of UH-60 MEDEVAC helicopters.
- 1999: Technical Rescue magazine designated the SKED Stretcher one of the top 10 rescue products of the millennium.
- 1992: The Defence Medical Standardization Board selected the Oregon Spine Splint II™ to replace all vest-type or half-board spinal immobilization devices in the DoD inventory.
- 1984: The SKED Litter (Stretcher) was the first-ever CASEVAC kit placed in the U.S. Army inventory.
- Skedco casualty evacuation and rescue systems have been used successfully in every major U.S. military operation since Operation Just Cause in Panama. Though its past successes are strong, Skedco is not complacent, continuing to set the standard with new and innovative solutions.

The company is headquartered at 10505 SW Manhasset Drive, Tualatin, Oregon 97062. Telephone: 1-503-691-7909.

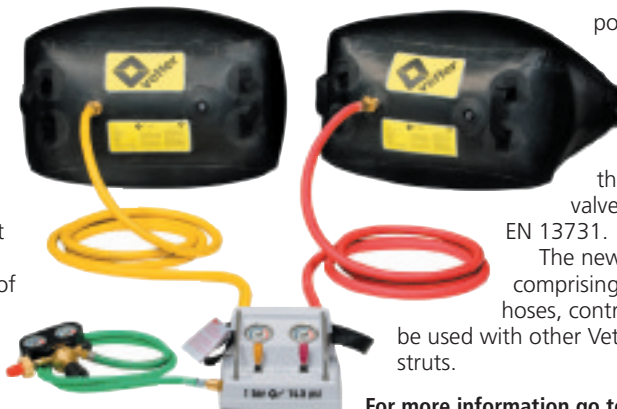
IFF

For more information go to
www.skedco.com

New Lifting Bag Is Wedge Shaped

German manufacturer, VETTER, has added to its rescue bag offering with the introduction of wedge-shaped lifting bags that are said to be easily positioned by a single member of the rescue team due to their lightness and the very low insertion height.

In the deflated condition, the tip of the wedge bag has an insertion height of just 30mm, rising to 60mm at the back of the bag. With a support area of 800mm by 800mm, loads can be lifted to a height of 600mm. The bags can be inflated in 40 seconds at an operating pressure of one bar. Carrying lugs are incorporated at the wedge tip and on the upper side for optimum alignment of the bag, and optimum pressure



point distribution and the bag's non-slip surface helps to avoid bag slippage away from the object being lifted. Safe operation features include controlled pressure distribution in the bag and an integrated safety valve. The bags are tested according to

EN 13731.

The new lifting bags come as a kit comprising two wedge lifting bags, inflation hoses, controller and pressure regulator, and can be used with other Vetter products, including Airshore struts.

For more information go to www.vetter.de

BA System Offers Two-Hour Duration

SPERIAN RESPIRATORY PROTECTION FRANCE has developed the Fenzy Biomix, believed to be the first semi-closed, long-duration re-breather with a fixed duration of two-hour, irrespective of the workload of the wearer or the temperature. It uses a mix of chemical oxygen (KO₂) and compressed air, offering a level of breathing comfort that is close to that of self-contained breathing apparatus.

The air is cool – less than 40°C – and dry, thanks to a venturi device, without the use of a cooling system. There is no fog in the mask thanks to the absorption of moisture by the chemical oxygen, the mask is maintained at positive pressure and the oxygen concentration is less than 30 percent to avoid any risk.

The Fenzy Biomix is equipped with the Fenzy Angel II ADSU/PASS device, and can be connected to the Fenzy Angel'Metry telemetry system that provides real-time information to aid the disposition of firefighters and enable either individual or general evacuation.

For more information go to www.sperian.com

New Remote-Controlled Monitor System

A new concept in electric remote-controlled monitor systems has been introduced by ELKHART BRASS. The off-the-shelf package comprises: two Spitfire stream/wide fog monitors; two SM-1250BE-HL nozzles; two monitor motor control panels; and two operator control panels.

For more information go to www.elkhartbrass.com/electric-valve-kits

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www.simulation.uk.com



Firebuy Opts For Hazmat Suit

Following an extensive qualification process and rigorous evaluation, SAINT-GOBAIN PERFORMANCE PLASTICS' ONESuit® Pro chemical protective hazmat suit has been accepted onto the Firebuy chemical protective clothing framework agreement. Firebuy is the UK government's Professional Buying Organisation (PBO) for fire, risk and safety products, acting as a centralised procurement body to ensure that only high-quality, cost-effective products and services are used by the national fire and rescue authorities.

Marketed as the ONESuit PPS in the UK, the ONESuit Pro met all of the standards for functional performance, safety, ergonomics and cost-effectiveness, and the Firebuy contract was awarded to Professional Protection Systems Ltd. (PPS) – the authorised supplier of Saint-Gobain's ONESuit Pro in the UK – under the chemical protective/gas-tight suit category.

The qualification and evaluation process assessed product features, reviewed the certification proving regulatory compliance and called for full field trials. With the highest level of certification recognised in the EU and Asia – EN 943-1 and EN 943-2 – the ONESuit Pro is engineered from CoreTech™ barrier membrane technology, and is proven to protect against liquid and gaseous chemicals, while its light weight and flexibility ensure maximum user comfort. PPS also met Firebuy's economic, financial and technical requirements.

For more information go to www.protectivesystems.saint-gobain.com



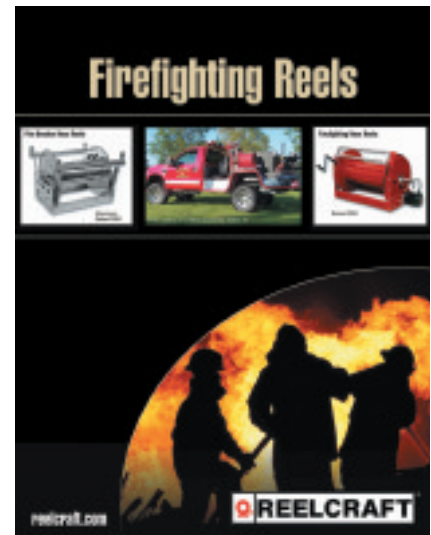
Study Confirms Pipe & Fitting Environmental Performance

An ISO-compliant, peer-reviewed life cycle assessment (LCA), conducted by ENVIRONMENTAL RESOURCES MANAGEMENT LIMITED, comparing the environmental impact of BlazeMaster® fire sprinkler pipe and fittings with steel pipe and fittings showed that BlazeMaster is the more sustainable choice.

Based on the results of the "cradle-to-grave" study, the detailed study covered a number of environmental impacts including: metal depletion; fossil depletion; terrestrial acidification; freshwater eutrophication; climate change; ozone depletion; human toxicity; freshwater ecotoxicity; photochemical oxidation; terrestrial ecotoxicity; water depletion and energy consumption (both non-renewable and renewable energy use). BlazeMaster's score exceeded – in some cases, dramatically – steel in 12 of the 13 categories.

For more information go to www.blazemaster.com

New Firefighting Reel Catalogue



REELCRAFT has published a new eight-page firefighting reels catalogue that features reel options, customising capabilities and the company's full range of large-frame hose reels for firefighting and rescue applications. The large-frame reels are promoted as providing improved efficiency, productivity, safety and protection, while protecting hoses and cables from damage. Designs are available to meet individual user's size, capacity, rewind motor and consistency requirements.

For more information go to www.reelcraft.com

New On-Board Power Unit

AMKUS has boosted its power units offering with the introduction of the new 240SS Super Simo, a 240 volt single-phase, electric on-board power unit that operates simultaneously two Amkus tools with hose lengths of up to 60 metres. This power unit is claimed to provide performance that is virtually the same as the Amkus Ultimate system that reaches its maximum pump pressure four times faster than conventional portable power units.

Amkus points out that, typically, a simultaneous power unit draws about 60 amps at in-rush or start-up, whereas the new 240SS incorporates advanced technology that requires only approximately 5 amps to start-up, with virtually no in-rush, significantly reducing the initial electrical needs. It can be installed in around just a single day.

For more information go to www.amkus.com



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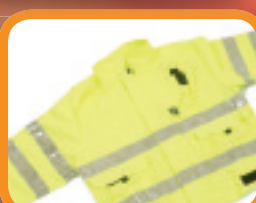
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Standards Round-Up

The recent NFPA Technical Meeting in the USA accepted a number of Standards, several of which are going to impact on the provision of fire protection.

Wetting agents

NFPA 18 (Standard on Wetting Agents) is limited to qualification tests, methods of evaluation, general rules for application, and limitations for use of wetting agents as related to fire control and extinguishment. The method whereby the wetting agent is added to water is not specifically set forth. The solution can be pre-mixed in tanks or can result from bringing the wetting agent into contact with water by any suitable proportioning device, providing the device is approved in accordance with applicable standards.

Storage, handling and transportation of LPG

NFPA 58 (Liquefied Petroleum Gas Code) applies to the storage, handling, transportation, and use of Liquefied Petroleum Gas (LPG). Gases defined in this code are gases at normal room temperature and atmospheric pressure that liquefy under moderate pressure and readily vaporise upon release of the pressure, which permits the transportation and storage of LPG in concentrated liquid form.

Protection of marinas and boatyards

NFPA 303 (Fire Protection Standard for Marinas and Boatyards) applies to the construction and operation of marinas, boatyards, yacht clubs, boat condominiums, docking facilities associated with residential condominiums, multiple-docking facilities at multiple-family residences, and all associated piers, docks, and floats. It is not intended to apply to a private, non-commercial docking facility constructed or occupied for the use of the owners or residents of the associated single-family dwelling.

This standard also applies to support facilities and structures used for construction, repair, storage, hauling and launching, or fuelling of vessels, if fire on a pier would pose an immediate threat to these facilities, or if a fire at a referenced facility would pose an immediate threat to a docking facility. NFPA 303 applies to marinas and facilities servicing small recreational and commercial craft, yachts, and other craft of not more than 300 gross tons, and those not covered by NFPA 307 (Standard for the Construction and Fire Protection for Marine Terminals, Piers, and Wharves) or NFPA 30A (Code for Motor Fuel Dispensing Facilities and Repair Garages).

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More information on these, and the other recently accepted NFPA Standards, can be found at www.nfpa.org/aboutthecodes



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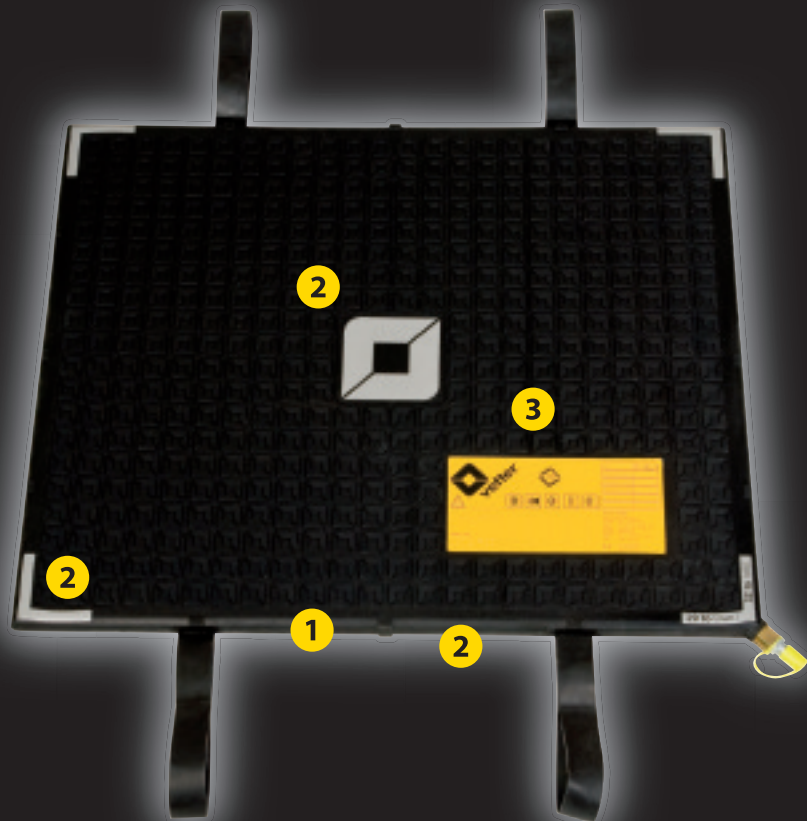
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Giving Rescue A Lift



By Jimmy Säfström

Heavy Rescue Sweden
and NATEL

Rescue is not about the equipment, it is about understanding the incident. If you understand the incident you will also understand which tools have what benefits, including lifting bags.

Lifting bags are used in heavy rescue or USAR scenarios. But what do terms like heavy rescue, extrication and USAR really mean and have in common?

Rescue generally has the objective of saving a person's life and/or preventing additional injury; heavy rescue is moving or stabilizing heavy objects, requiring lifting equipment and more than normal stabilisation equipment; and extrication is a systematic act for creating space to remove a victim without uncontrolled movements or instability. In many respects, they are all part of the same process. USAR is definitely the exception. In essence though, they are all about the stabilisation and lifting of heavy objects in a controlled way. It is the opposite of a recovery scenario where control and time are less of the importance.

There are three reasons for performing a lifting/moving/shifting operation;

- 1** To get access to or search for a casualty.
- 2** To free the casualty from entrapment.
- 3** To make or be able to perform a safe extrication, which may involve the moving of a load if one object is still laying on another.

not complex, providing you follow the correct procedures.

Regrettably, I receive too many pictures of accidents where neither the best or right method was used to make an effective and safely rescue. Can teams be blamed for this? No not really, there are no standards in heavy rescue, but there should be. The same goes for stabilisation, truck accidents and large-scale incidents involving structures or trains.

What goes wrong?

Mistakes are easily made in heavy rescue; arriving on the scene of the incident to be confronted with an unfamiliar scenario, one that you have not trained for, loosest you 20 minutes. Equipment selection, correct stabilisation and where to lift can all have a dramatic impact on the speed and success of the operation. The reality though is that it is not that complicated, once you know the basics and have been properly trained.

Control of the centre of gravity and rotation points

Lifting is all about controlling your object, which

Mistakes are easily made in heavy rescue; arriving on the scene of the incident to be confronted with an unfamiliar scenario, one that you have not trained for. Equipment selection, correct stabilisation and where to lift can all have a dramatic impact on the speed and success of the operation.

Know what you need to know

Situations involving a truck, bus or other heavy objects are getting more and more common. But it is important to know how to perform the rescue operation when you arrive on the scene.

For example, bus accidents are all too common in Sweden, due in part to the extreme winter conditions. Over the years the essential knowledge was not available and mistakes were made, costing lives. More than ten years ago I was asked to research bus accidents and how they could best be handled. Over 800 operations – and, of course, some mistakes later – we think we now know how to perform them and I gladly want to share this knowledge. One of the conclusions is that it is

basically is your centre of gravity (CG). You can control the CG by using a rotation or pivot point; if not, you are floating the load giving it the opportunity to move in any direction.

Next you fix the rotation point, including the pivot point, to create a stable object that will remain where it is. Remember though that there may be rotation points other than the pivot point on, for example, an articulated bus or large industrial earth-moving piece of equipment.

Radius and arc movement

The pivot point lifting creates an arc movement of the object, and this can greatly affect the equipment and the control of the object. It can even

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make it fall out. That is why lifting should always be combined with a second safety device; every centimetre that is lifted should be secured with another device – period.

There are some manufacturers that claim that this is unnecessary with their equipment. I question these assertions. It is not about how good the equipment; you can do the training or take a photograph in a controlled environment, but in a real rescue scenario it is about performing a safe operation without any mistakes. So, always have a second safety device.

Why lifting bags?

There are different ways to go about answering this question, but let me try to answer by returning the following questions.

- 1 Which is better, having the perfect tool for one scenario, or one tool for all jobs?
- 2 Do you know in advance how heavy or what object you are going to face?

I see too many occasions where conclusions are made about what equipment to purchase based

**I see too many occasions
where conclusions are made
about what equipment to
purchase based on it looking
right in a brochure or that it
worked well in the one type
of scenario.**

on it looking right in a brochure or that it worked well in the one type of scenario. In heavy rescue or USAR you never know what you are going to face. The weight of the object may be 1 tonne or 100 tonnes; the structure may be weak (as in the case of a bus) or strong like a truck chassis (but not the cabin). Therefore you need equipment that is versatile. Well, nothing is more versatile than a lifting bag because it:

- 1 Has a high capacity going up to 100 tonnes (compare this to any other device, including a ram or crane)
- 2 Can go anywhere; has a small insertion height; and is light weight with a large surface area (keep in mind that weak structures need a larger surface area otherwise they may crack).

The differences between bags

Lifting bags can be divided into three types:

- 1 Low pressure "pillow bags" (1 bar).
- 2 High pressure "square bags" (8-10 bar).
- 3 High pressure "NT bags" (10 bar).

Do not mistake the pressure with the capacity. You still hear people say that high pressure is stronger than low pressure when comparing hydraulic tools; the same goes for lifting bags. Capacity works by the natural law; capacity = pressure x surface area.

So surface area is as important as the pressure.

So do you compare performance? To check the capacity, multiply the pressure by the area. The issue with airbags is that surface area changes, as airbags become rounder the higher they go. So the airbag that retains the most surface area and has the highest pressure logically has the most capacity.

Since surface area is extremely important for

capacity is retained when lifting an uneven or pointed load.

Thirdly, keep in mind the arc movement. Arc movement puts a side load on the bags and this increases when you attempt to stack bags on top of one other and go higher into a lift. "Square bags" that are stacked are unstable when side forces increase.

Surface area is as important as the pressure. So do you compare performance? To check the capacity, multiply the pressure by the area. The issue with airbags is that surface area changes, as airbags become rounder the higher they go. So the airbag that retains the most surface area and has the highest pressure logically has the most capacity.

the capacity. Keep the following in mind – most objects do not have a flat surface area so, If you cannot maximise the surface area, you lose that capacity of the lifting bag. "Pillow bags" face this problem most of the time (anything that is not a flat surface becomes a problem); "square bags" have the same problem (although you can attempt to use wood to distribute the force, but that is not without its problems); "NT bags" have a built-in plate to distribute smaller areas, so full

"Pillow bags" are basically big bags that create significant side forces and do not become stable until fully inflated. This is largely solved by using a wedge-shaped "Pillow bag" (which I helped to develop). It works well in bus accidents, but you still will never be able to use it for lifting an axle or uneven surface.

"NT bags" can be connected to each other in the middle of the bag using a steel connector. This allows it to rotate well with the arc movement. It is



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possible to stack three “NT bags” on top of each other, but keep in mind that there is a limit how much arc the “NT bag” can take. An added advantage to stacking the “NT bag” is that you can trade height for more capacity so the surface area stays larger.

Conclusions

It is all about understanding your scenario and understanding how an object’s movement can be controlled. Always work with a pivot point and

use a second safety device. I think its key to choose equipment that is versatile; an airbag that can deal with different scenarios and works well with other equipment such as cribbing blocks and struts.

“Wedge pillow bags” work well with an object that does not weight so much and has a flat surface – like a bus on the side. I started working with “NT bags” a few years ago and was impressed by how versatile they are and the capacity they have.

IFF

Jimmy Säfström is an instructor at Heavy Rescue Sweden and NATEL

For more information go to www.natel.info/ and www.heavyrescue.se/

It is all about understanding your scenario and understanding how an object’s movement can be controlled. Always work with a pivot point and use a second safety device.



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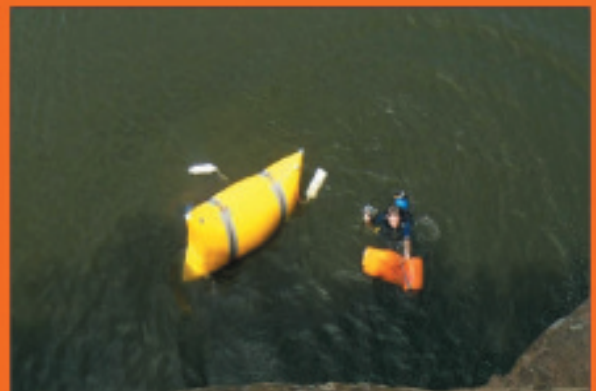


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Advanced Vortex rigging on the Port of Seattle Cranes. Pic courtesy Ropes That Rescue



By Gregory Sobole Jr.

Ropes That Rescue

On The Ropes

Seattle Fire Department's Technical Rescue Team sets its sights beyond technical proficiency in rope rescue. They aim for nothing short of excellence. Greg Sobole elaborates.

New recruits in the Seattle Fire Department train hard for thirteen weeks to prepare for their career. Intense basic training is centered around hundreds of hose lays and ventilation drills, first in the drill tower then during live fire training. Nestled in those three months, however, is a single week dedicated to the basics of rescue. In that time, that brief respite from demanding drill instructors and soaking wet duty boots, recruits are methodically taught automobile extrication, confined space rescue, trench rescue and collapse rescue. But that week always begins with rope rescue instruction.

Rigging with ropes to move a load vertically or horizontally is essential to a rescuer's success in confined space, trench and collapse rescue. Moreover, in earthquake-prone Seattle, where aging bridges and soil liquefaction are sure response impediments after an earthquake, the lone fire company can not reasonably expect technician-level help in a timely manner. Basic rope training allows these companies to easily move people and

tools over rubble piles and to secure unstable objects. This is why the entire Seattle Fire Department is trained, at minimum, to the NFPA operations level standard.

Rope rescue and rigging are taught to both recruit and veteran firefighters alike by members of the Seattle Fire Department's Technical Rescue Team [TRT] also known as Ladder Company 7. The team consists of thirty-two members, each of whom is trained well beyond the NFPA technician level in the disciplines of rope, confined space, heavy machinery extrication, collapse, tunnel and dive rescue. Many departments train and prepare for special operations because there exists a reasonable expectation that, at some time, an event will occur that requires specialized knowledge and specialized operators. Sometimes, however, preparations for these so-called low-frequency, high-risk events occur only after such an event.

The southern end of Seattle's Elliot Bay is lined with dozens of large cranes that load and unload a constant flotilla of oceangoing container ships.

ROPE RESCUE

Firefighter Jimmy Walker rappelling on the Seattle Municipal Tower. Pic courtesy Ropes That Rescue



At 41 metres tall, crane operators are beyond the reach of aerial ladders. In the early 1990s, a port crane operator suffering from a medical condition required evacuation to the ground. A rope rescue seemed the obvious and straight-forward strategy. Unfortunately that rescue, which by today's standards would take less than fifteen minutes, took nearly an hour – a rather embarrassing ego bruise and reality check for the Seattle Fire Department.



Firefighter Tim Danosky attending a patient on a high line. Pic courtesy Ropes That Rescue

Thereafter, under the direction of several firefighters who were also experienced mountaineers and rock climbers, and using a mix of recreational climbing equipment and prototypical rescue equipment, members of Ladder 7 immersed themselves in the discipline of rope rescue to codify and standardise rope operations for themselves as technicians and the entire department in general. Techniques and philosophies during the team's early years were heavily influenced by Arnor Larson of the British Columbia Council of Technical Rescue. His school provided many of the theories and techniques that, while now slightly evolved, are still used today.

Seattle rescue technicians practice their "art of clean rigging" frequently and with great pride. It may be fairly stated that a team characteristic was, in part, infused into the team by the passionate, progressive and internationally-regarded rope rescue trainer, Reed Thorne, principal instructor of Ropes That Rescue in Arizona. Thorne's emphasis on creative thinking and team building, set upon a solid foundational knowledge of the reasons behind the rigging techniques, set the team's sights beyond technical proficiency to excellence.

Each technician attends a minimum of one class taught by Thorne – typically a course that emphasises team skills. After seven, ten-hour days of total immersion in pulley systems, knot-craft, anchors, litter rigging, and high directionals a Seattle Technical Rescue Team member can easily describe why a technique is used rather than merely explaining how a technique is performed.

The team's basic tools

The Technical Rescue Team uses and teaches a two-rope philosophy. One rope is the main line used for raising and lowering loads. The second rope is the belay line and remains parallel to the

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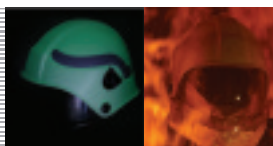
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ROPE RESCUE

Training over a 200 foot deep tunnel. Pic courtesy Ropes That Rescue



main line but is not kept under tension while in use. And at no time is the belay line used to hold a load during changeovers or knot passes. If any single point in the main line rigging fails, then the belay line will prevent a fall. So, rather than overbuilding a single system with stronger carabiners, heavier rope or duplicate pieces of equipment, the TRT uses a parallel system.

A system that exhibits parallelism, such as the loaded main line and the unloaded belay attached to separate suitable anchors, exponentially increases the safety factor. Because, while a stronger carabiner or thicker rope could increase the safety factor of a single-point system, it is still a single point that, if it failed, would allow the load to fall. Having a parallel belay line and a competent belay operator make the two-rope system extremely safe.

Belay-line operators have equipment options for rigging a belay line. A simple Munter hitch, for instance, may be used to protect another team member as he or she moves toward a hazardous edge or during his rappel. For two-person loads, the classic tandem Prusik belay is the most common choice. In recent years, Seattle eliminated the Prusik minding pulley [PMP] from the belay rigging. The PMP is commonly used during raising operations and allows one person to pull up the belay line quickly, while the PMP's square-bottomed side plate minds the Prusiks. New testing shows the possibility of the Prusiks loosening while using this technique, which could compromise the belay's ability to catch a fall. Because Seattle's team is constantly learning and looking for the latest information, this subtle change is ahead-of-the-curve compared with other departments.

The Traverse 540 belay device is also available; it is, in fact, the standard belay for operations level companies in the city. Because Seattle uses

half-inch rope, the 540 gets mixed reviews from users. The rope is stiff and difficult to pass smoothly through the device. Also mud and rain, common in Seattle, negatively affect the device's performance. However, in a vertical orientation, such as a top-based belay station on a steel structure, the 540 works far better than the tandem Prusik belay because it requires less movement and physical labour to operate than a tandem Prusik belay.

For main line operations the standard "Plan-A" is a pre-assembled rigging plate with all the Prusiks, pulleys and anchor straps necessary to lower and raise a load without having to unload the main line. A "hot changeover" setup eliminates the need to employ load releasing hitches, which themselves take time and skill to tie. Having this hot changeover setup pre-assembled saves a considerable amount of setup time. Yet while the hot changeover is quicker and easier than older techniques still practiced by

many departments, the TRT also has the minimalist option of using the Petzl I'D.

The I'D is a single device that acts as a friction appliance during lowers – or rappels – and can act as a "pulley" of sorts during a raise. When used during a raise, rope feeds back through the device during a haul and will stop the load from lowering, thereby capturing progress and allowing pulley system resets. The I'D, however, is not a true pulley since it does not have a sheave; the rope merely runs around the outside of an eccentric cam. Consequently it is not an efficient device for long raises because of the additional friction. But to overcome the excess friction, rescuers simply build a higher mechanical advantage or get more haulers – not usually a problem in a department with a thousand firefighters.

Portability of equipment is an important issue when sending rescuers up the Port of Seattle's cranes. Crane elevators are cramped and can only hold one or two people; so the first two rescuers take a backpack and a rope. The backpack has all the equipment necessary to establish two anchors and then quickly rig the main and belay lines. Any additional equipment needed for advanced rigging is carried in a support pack. Carabiners, pulleys, Prusiks and anchor building material weigh down the support pack making its deployment discretionary. Beyond the cranes, Seattle has no shortage of utility poles and towers, such as cell and power transmission towers. Keeping only the basic equipment in a lightweight and easily accessible pack makes for swift climbing to reach unstable victims.

The AZTEK, a personal edge protection kit stored in a small pouch, has long been part of the team's equipment. Each person on the team is assigned a kit and several more are kept available for use in systems. The heart of the AZTEK is 15

metres of 8mm or 9mm rope. One end of the rope is called the personal end and is tied to a carabiner. And on that rope is a Purcell Prusik. This Prusik attaches to the rescuer's harness and the carabiner is clipped to a suitable anchor. This allows the rescuer to slide the Prusik along the secured rope as he advances or retreats from the edge. Should the rescuer fall, the Purcell Prusik acts as a shock absorber to minimise injuries sustained from a sudden stop.

At the AZTEK's other end, often called the system end, is a set-of-fours – a compact pulley system no bulkier than a small cargo pocket. The set-of-fours can be used as a 4:1 or 5:1 mechanical advantage in a wide variety of applications such as: a litter attachment point, lifting a patient a short distance, assisting in passing a knot around a system pulley, installing a dynamic directional to change the direction of a rope, guying high directionals, and creating floating anchors . . . the list goes on. The AZTEK is standard equipment for the TRT and given the tool's versatility, a Seattle technician would be the last one to arrive at a rope rescue without one secured to his or her harness.

Advanced rigging

In constructing rope systems, the commandment to "rig high" is taken to heart. A directional pulley above the edge allows rescuers and victims to easily transition over the edge without the bruises and strains often seen during a low-edge transition. Also, being able to load the system before

swinging the rescuer over the edge increases safety since the system is tested without the rescuer hanging in exposure. The high directional anchor is typically a structural or natural feature, such as a beam or a tree, to which a pulley is attached. However, when these features are unavailable, the team utilises the Arizona Vortex to create an artificial high directional or AHD.

The Vortex is a portable tripod at its most basic and easiest use. But the versatility of the Vortex allows a multitude of bi-pod and mono-pod configurations – great for set-ups in wilderness and industrial sites alike. Easy and quick configurations, like the tripod and sideways A-frames, are typically used during actual rescues. However, the Vortex can be set-up in complex and elaborate ways.

These advanced setups are possible because of the creativity, teamwork and communication fostered during weeks of classroom study and hands-on training. Elaborately rigging the Vortex forces team members to practice and perform at a much higher level of rigging than actual rescues demand.

The field of rope rescue is never static; the discipline changes in subtle ways every year, as new equipment emerges and as those teaching the subject encourage each other's creativity through competition. Seattle's Technical Rescue Team fuses the discipline's dynamic nature with their vigorous training philosophy every time the rope comes off the truck keeping them on the cusp of technique and innovation.

IFF

Gregory Sobole Jr. is a member of the Seattle Fire Department and works on the Technical Rescue Team. He is also an instructor with Ropes That Rescue.

For more information go to www.ropesthatrescue.com and www.cityofseattle.net/fire.

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By Javier Fernandez

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Heavy Hose Retrieval

Large diameter hose has become the norm in most fire departments. Yet, despite the risk this hose poses to our most valuable resource, the firefighters, some discount a hose retrieval system because they have always done without it.

We have all heard the joke: “That is what we have recruits for.” Well, it is no joke. What can hose retrieval tools possibly save your department if you are getting the job done without them? The answer is simple; a lot of time, money, and needless injuries.

Lifting heavy hose is risky

Today, back injuries are the number-one cause of early duty disability retirement in the fire service. A single back strain injury, even one that is not career ending, can easily cost tens of thousands of dollars in medical care and lost work hours, and most back strain injuries occur when lifting hose. These preventable injuries not only damage careers and change lives, they compromise staffing and, significantly in these times of tight budgets,

unduly cost employers in overtime and workers’ compensation fees.

Much has been written about the challenges of aging firefighter ranks, as older firefighters sustain injuries more often, while recovery times are longer and less certain. Most fire departments in the United States are staffed by volunteers, so the number of responders to a fire call is variable, depending on such things as the day of the week and the time of the day. Injury leave is a real hardship since it means fewer hands-on-deck, and fewer hands result in longer scene times and a greater demand on each firefighter in both time and increased risk.

Only injury prevention practices make sense, and those that target high-risk activities such as lifting heavy, wet, large fire hose must be taken



seriously by any manager who is accountable for lives, scene times, and response numbers.

Smart hose management

After a fire, when crews are exhausted and overheated, the job is not nearly done. They must drain, roll, and stow all the fire hose they have used. It is then, after the fire is out, when fatigued firefighters are most susceptible to injury from their own equipment, or lack of it. The hundreds or thousands of metres of wet, heavy, cumbersome hose is their enemy, so having a tool that reliably handles that hose in a safe, efficient manner can make all the difference.

Using valuable firefighters to shoulder, drain, and stoop to hand-roll LDH, and to then carry the 45kg rolls to the rig is needlessly risky now that tools are available to make the work safer. Short-cuts, like driving an apparatus while firefighters walk on the bed loading lengths of hose are not only foolhardy, they are negligent.

Not all tools created equal

So, hose retrieval tools can make a difference by helping firefighters drain, roll, and stow hose in less time, with fewer people, and do it safely and easily. Not all the tools are created equal though. Buyers must evaluate each with these questions:

- Does it drain hose?
- Does it roll hose?

- Does it carry hose rolls?
- Does it make loading hose up on the rig bed easy, fast, and safe?
- Will it handle all size hose?
- Is it portable?
- Is it manual or does it require batteries, gas, or electric power?
- Do you have to buy another vehicle to mount it on?
- Is it an expandable system as our budget allows?

Other concerns include:

- Cost
- Warranty
- Durability
- Storage
- Reputation
- Shipping time

Hose retrieval tool options

The RollNRack hose management system

A firefighter-designed and patented portable system. This full system of hose management tools has been on the market since 2003 and handles all hose from 38mm through 185mm, helping to drain, roll, and load hose.

A manual tool, the RollNRack with the LDH drain attachment, rides with fire crews on rigs all over the world. It makes shoulder draining a thing

of the past and hose rolls never have to be lifted. Two people can load a hose bed in less time than six can do it without the RollNRack. It can be upgraded to the motorized RollNRack Power Roller at any time.

The self-propelled RollNRack Power Roller drains and rolls 185-metre sections of LDH in less than 30 seconds. Its battery will drain and roll 1200 metres of LDH on a single charge. Its patented coupling jaws can handle all hose from 38mm to 125mm while the Power Roller XL, introduced in 2009, handles 150mm and 185mm hose. It is used in industrial, refinery, and military settings around the globe.

With this system, large diameter hose rolls never have to be lifted off the ground. Hose can be stored as rolls are easily flaked up onto a rig bed. The user decides which portion or portions of the system they would like and can upgrade or add components anytime. The units are portable, stowable on apparatus, ergonomically and sturdily designed.

The Rookie portable fire hose roller

A gas or electrically powered tool that is trailer-hitch mounted for towing behind a service vehicle. It can also be mounted to a stand for use in the



station. It has been on the market since 2002. Several models are available. The units do some draining and roll between 20mm to 185mm hose and are of an industrial design.

After hose couplings are disconnected, hose is allowed to passively drain. If the hose still has water in the line, the hitch-mounted unit is taken to the hose for rolling. The coupling is placed onto a pair of PVC pipe-covered metal pins that are threaded onto a vertical metal disk. A foot actuated switch, controlling the speed of the spinning disk, is pressed by the operator and the hose is dragged to the apparatus. The operator



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facing the spinning roll, releases the foot switch when the length is rolled up completely. A 30-metre length of 125mm LDH is drained and rolled in under 30 seconds. The roll must be then lifted by two firefighters off the pins and placed into a wheelbarrow-type re-loader for loading.

The Hose Mule fire hose loading system

A firefighter-designed hose loading system that bolts onto an engine and stays in place for use when needed. This unit is much like Angus's FETCH system. It can be front, side or rear-mounted with additional roller guides and has been on the market since 2009. Additional mounting plates and roller guides are necessary if the unit is to be moved from one rig to another.

After a fire, the unit is swivelled and locked into place for use. One firefighter is the dedicated operator of the unit in the rig bed; two other firefighters flake the LDH into the hose bed while sitting or kneeling in the hose bed and the hose is drawn up without breaking the couplings. The driver of the vehicle drives parallel to the laid out hose in order to ease drawing the hose to the rig mounted unit.

The driver of the apparatus stops alongside of the hose laid out. The hose coupling is given to the Mule operator and is fed through a small chute and over a roller. The upper portion of the device is then lowered onto the hose. The hose is drawn up with the operator's activation of a switch at the unit. The driver starts to drive forward while two other firefighters, also riding in

the hose bed, flake the hose into the bed. When couplings arrive to the bottom roller, the operator swivels the upper portion of the unit upward on a hinge and the coupling is pulled through the unit. The upper portion is again lowered onto the hose.

Comparing the options

While there may be other tools for hose retrieval, these are the best established.

Both RollNRack and Rookie comply with US National Fire Protection Association (NFPA) 1500 standards for large diameter hose operations. However, the Hose Mule depends on firefighters themselves for compliance.

With the Rookie system, all hose is drawn to the unit, be it mounted on a trailer hitch or on a stand. This may tend to wear out the hose covering and can place an undue strain on the hose where it is attached to the coupling. You also must still lift the heavy large diameter hose rolls off the wais-high metal pins. Forestry hose is handled nicely.

The RollNRack Hose Management System is the only system that handles all hose and offers options to customers, as the system is customised for each department's needs and budget.

Staying safe is more than a tag line. It means making smart purchases and using innovative tools to support and protect your most valuable asset – your firefighters. They will stay safe when their department makes them safe.

IFF

Javier Fernandez designed and patented the RollNRack Hose Management System and is the CEO of RollNRack

For more information go to www.rollnrack.com

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Back-Up - The Secret



**By Mark van
der Feyst**

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When it comes to effective nozzle management, the back-up man is the workhorse of the firefighting team.

Without the back-up man, the task of advancing a hose line becomes much more difficult and more time consuming. Whether advancing a hose line with two, three or four people, the amount of work being performed by the back-up man will be the same.

So, it is essential to practice the basics of the back-up man position in order to master the skill of this important job. With the number of fires decreasing, opportunities to practice this role are rare except while training, when the position can be practiced anywhere there is access to a hose line, an engine to pump, and an open area in which to practice. Add in a few stairs, a standpipe, or a few corners and you will have an excellent true-to-life training environment.

The back-up man is the sole support of the nozzle man. His – or her – job is to take the nozzle reaction away from the nozzle man by providing support with his full body weight. As shown in this photograph, the back-up person is right behind the nozzle man. Look at how he has his upper body buried right below the nozzle man's

shoulder. His whole body is supporting the nozzle man, taking away the nozzle reaction and stopping the nozzle man from moving back from the nozzle reaction. The only objective that the nozzle man has to worry about now, is controlling the nozzle and suppressing the fire.

Both hands – not just one hand – of the back-up man are on the hose. This seems to contradict conventional basic training that suggests that one hand should be on the on the hose while the other hand is on the back of the person in front. The idea was that, by having one hand on the hose and the other hand on the shoulder of the man in front, it meant that the correct space was maintained between the nozzle man and the back-up man. Conventional wisdom also taught that one foot should be placed behind the nozzle man's to provide support.

That works well enough when standing posing for a photograph, but when pumping 130 psi (900 kpa) to 150 psi (1000 kpa) it is essential to have both hands on the hose to provide full support to the nozzle man. Without both hands

Of Hose Management

on the hose, the nozzle reaction is not taken away and the nozzle man is not backed-up effectively. Most times firefighters are kneeling on the ground when advancing a hose line for interior attack, where putting one foot behind the nozzle man's foot does not work; it is essential to use the whole body.

Firefighters wear bulky structural firefighting gloves that hinder the ability to hold the hose effectively and provide support. They take away some dexterity from our hands; they are too bulky, too big for our hands, not sized properly, too wet or too stiff if they are dry. In some ways they work against us. While they provide thermal protection, abrasion protection and weather protection, they take away the ability to use our hands to their full dexterity. If a firefighter has small hands to begin with, this will be his number-one challenge and will make the job even tougher. So make sure both hands are on the hose to support the nozzle man.

The stance the back-up person takes is important as well. Notice how the back-up firefighter is kneeling, with both knees firmly on the ground, allowing him to support the nozzle man as well as himself. He is rooted-to-the-spot, which gives him more stability and more endurance to support the nozzle man. In martial arts, the teaching is to take the horse stance when fighting, which ensures stability when fighting, providing an advantage over the enemy. The same applies here. By having both knees on the ground, the firefighter has more stability and so is better placed for hose advancement.

The back-up man can also effectively provide the nozzle man with “eyes in the back of his head”, as he will be able to see what is going around them as well as behind them. The nozzle man is going to be busy trying to find the seat of the fire and then applying water to it, and sometimes this can lead to tunnel vision, where the surroundings are ignored and focus is centred on one task – the fire. The back-up man should be checking the environment around them at all times.

The back-up man is also the communicator of the team. He will be the one communicating with



one turning on the water supply.

In some of training manuals, we are shown other techniques that replace the use of the back-up man, incorporating the use of hose straps designed to assist the nozzle man by providing full control of the hose line and the nozzle. This method of hose line control may seem innovative,

The back-up man is the sole support for the nozzle man.

His – or her – job is to take the nozzle reaction away from the nozzle man by providing support with his or her full body weight.

the other firefighters inside the structure when needing more hose, taking hose out, or if they need help. He will also be the one doing most of the work on the hose line. When, for example, more hose is needed, it will be the back-up man who will be the one responsible for feeding it. When they are hooking up to a standpipe system it will be the back-up man who will be responsible for establishing the hook up, and then making sure that all the kinks are out of the hose line as it is being advanced into position. He will also be the

but does it really work? The hose strap will take away the nozzle reaction, but it does not allow the nozzle man to have full control of the nozzle. The main objective of the nozzle man is to control the nozzle, and this is achievable only with the aid of a back-up person. For defensive operations, one person can operate a hose line, but not with a hose strap. They are better off looping the hose line under itself and sitting on it. This way they will be able to control the nozzle and not have to fight against the nozzle reaction.

IFF

Mark van der Feyst is an instructor at FireStar Training Services Inc

For more information go to www.firestartraining.com

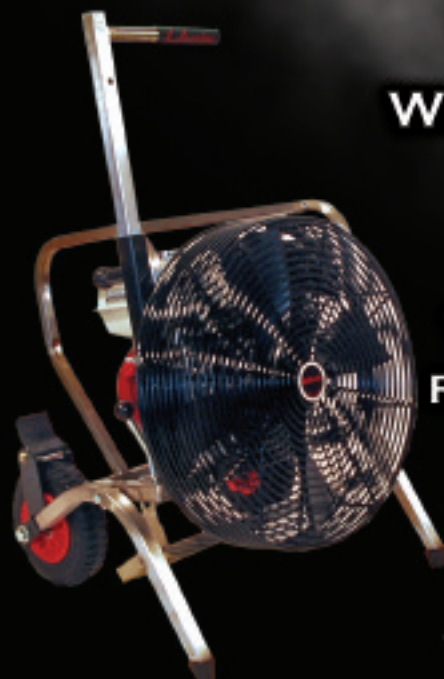
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PPV – The Changing Face of Fireground Ventilation



Roger Weinmeister

Super Vac

PPV – Positive Pressure Ventilation – is a firefighting technique that has consistently been improved since its introduction in the 1980's.

PPV was first introduced towards the end of the 1980s, prior to that time there were two different types of ventilation. These were vertical ventilation and negative pressure ventilation (sometimes known as smoke ejection). The latter technique being when smoke and fire gases are on the negative side of the fan, as opposed to positive pressure ventilation when smoke and fire gases are on the side of the fan where the pressure is positive. These techniques were generally utilised after there was no chance of survivability or after the fire was totally extinguished. Although they were effective for property conservation, they did little to help with life safety on the fire scene.

Since the introduction of PPV much has been written about its application, benefits, the need for training and assessing suitable applications for its deployment. However, the general consensus of professional firefighters around the world is that the technique, when properly deployed, offers

some major benefits. The effective use of PPV increases visibility and significantly reduces air temperature, allowing victims and those fighting the fire a better chance of surviving.

What is positive pressure ventilation?

Positive pressure is achieved when air is forced into a building using one or more fans. These fans force air into the structure to create a higher pressure inside the building relative to the external atmospheric pressure. This pressure differential forces heat, gases and other products of combustion through a suitable outlet vent to the open air while replacing them with cool fresh air.

PPV makes a considerable contribution towards the removal of the large quantities of carbon monoxide and the other toxic and carcinogenic products that are present both during and after a fire. This has a welcome beneficial impact on the health and safety of the building's occupants and



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those entering the building to fight the fire. In many cases, fire victims can be supplied oxygenated, cool air due to the application of PPV, prior to being rescued by fire personnel. Additionally, it can help in the important job of maintaining primary and secondary egress routes, aid in locating the source of the fire, and the dramatic reduction in time-sensitive search and rescue times.

Hazards and risks

As with many modern firefighting techniques, PPV must be effectively and closely coordinated on the fireground. Lack of coordinating the opening of ventilation points, and applications of the fans is almost always the root cause in ineffective PPV application. It is imperative that the location of all interior firefighters is known prior to PPV being initiated.

There are other considerations in applying the use of PPV. These include the production of CO and other by-products of combustion by PPVs powered by petrol engines. The use of exhaust extensions can minimise this risk, but must be applied carefully considering wind direction and the effect of very hot exhaust. Critics also express concerns over the size and weight of the equipment, what they see as the potential to jeopardise personnel safety if misused and the need for additional training.

However, in practice, these concerns have proven to be unfounded, particularly with the introduction of the latest PPV fans. Both firefighters and equipment manufacturers readily agree though that training is absolutely imperative and that the deployment of PPV techniques needs to be seen as part of the overall firefighting tactical plan.



Tests have shown that the risk of trapping building occupants or firefighting personnel between the fire and the outlet vent is much lower than was originally thought and that the benefits far outweigh any potential disadvantages. The same can be said for concerns relating to the risk of igniting the hot smoke as it mixes with oxygen at the outlet vent. This can be easily controlled by proper training and providing a covering water stream at the outlet vent. In short, all of the recent studies have shown that the likelihood of PPV increasing the risk to occupants of the building are far outweighed by the rapid improvement of the



conditions inside the building and more effective fighting of the fire.

Establishing proper controls

There are six steps that need to be taken to ensure that PPV techniques are effectively and safely implemented. These can be summarised as the need to:

- Implement a phased approach to the introduction of PPV.
- Ensure proper training of the firefighting crews.
- Establish effective command and control procedures.
- Use the most suitable equipment.
- Establish essential fire ground communications.
- Adopt the most appropriate application techniques.

It has to be widely understood that PPV needs to be coordinated with other firefighting activities. One of the most effective methods to achieve this

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is the phased introduction of PPV – first in training scenarios, then on the fireground after the fire has been extinguished, and finally on the active fire scene. PPV should not be adopted as part of the fire ground operations until every member of the fire crew has a thorough appreciation of the use of ventilation, and how this affects the behaviour of fire.

At the site of the fire there are several questions that need to be answered. These include the size of the compartment to be ventilated, the location of the fire, the likely location of any casualties and an assessment of backdraught or flashover potential. Additional considerations are wind direction, determining the location of the essential outlet vent and the provision of water streams to cover the outlet and possibly nearby structures.

Clearly, PPV is not appropriate where there is a risk of either back-draft or flashover. In such situations vertical ventilation (or a variation of the same) is the only recognised safe solution. It is also not advisable to use PPV in conditions where the wind strength or direction will obviate the effects of the fan or fans. Generally, PPV should not be attempted directly against a wind of 20 Km/h or higher.

Latest PPV equipment

There are two growing trends in the use and application of PPV. The most significant is the increase in the use of variable speed electric motors to replace petrol driven engines. Variable speed motors have more rpm speed and can thus move more air than single-speed electric motors. This, coupled with the fact that they are extremely reliable, create less noise, and to not add CO and other by products of combustion into the air stream, contribute to their increased use.

Another growing trend is the increased use of very large blowers (VLB's). VLB's can extend the benefits of PPV to large structures, including high-rise buildings, large retail outlets, convention centres, warehouses, and tunnels. While portable PPV fans



and fan groups can be effective with up to 20,000 cubic meters of interior space, larger buildings require significantly higher airflows. Just as vehicle-based ladders extended the reach over hand ladders as buildings grew taller, VLB's are extending the effective PPV reach as larger spaces are enclosed.

Another advantage to current PPV equipment is the increase in accessories designed to make ventilation safer, quicker and easier. There are currently many options that add lighting to PPV fans. These include large Halogen, Metal Halide, and LED lights to help illuminate the area around the fan and directly inside the structure. Misting attachments can be used to add the cooling effect of water to the airstream, plus there are foam attachments that can turn a PPV fan into a high expansion foam generator.

Application techniques

The successful use of PPV is also dependent on the number and positioning of the fans. Where a single fan is being used it needs to be positioned so that the stream of air is directed at the centre of the opening, with the cone of pressurised air just covering the doorway. An often-quoted rule of thumb is to position the fan the same distance from the doorway as the doorway height. It is important to ensure that the recommendations of the fan manufacture are used in conjunction with training to determine optimum positioning for effective airflow.

Where more than one fan is used, these are most effective if placed side by side in a "V", rather than in series, one behind the other. This placement increases the total airflow into the building, just as two different hose lines increase the total water flow available at the seat of the fire. Additional advantages of the "V" placement include a clear, straight path for hose lines and firefighters entering the building.

It is, of course, essential to create the outlet vent before engaging the PPV fan or fans. Ideally, this should be about the same size as the inlet opening as this helps to ensure maximum airflow through the building. This may well call for other apertures in the building – doors and windows – to be closed. Under no circumstances should the water stream positioned at the outlet vent direct water into the building while venting is taking place, as this could put firefighters inside the building at considerable risk.

Of course, many fires are in buildings that have more than one room, floor or enclosure. In such instances, the appropriate technique is to adopt what is known as sequential ventilation.

This involves providing the maximum volume of pressurised air to ventilate each enclosure in turn. This can be accomplished by sequentially opening and closing of doors leading to the various spaces. In extreme cases, it can mean manhandling the PPV equipment along corridors or up staircases

and is why, if for no other reason, weight and manoeuvrability of the equipment is so important.

What next?

It is evident that there is a compelling case in favour of the use of PPV. This is particularly so following the introduction of the latest equipment that overcomes many of the earlier concerns and today's greater understanding of the need for training and fire scene control and communication.

This appears to be a view shared by many firefighting professionals around the world. There are many instances of opponents being converted into believers after seeing the effectiveness of this technique on the fireground. Undoubtedly though, all would confirm that the key to its successful use is to consider at all times that PPV is part of a well organised and coordinated fire ground operation.

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Roger Weinmeister is
president of Super Vac

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By Paul Gibson

Bristol Uniforms

Protecting The Protector

In recent years the design and development of protective clothing for firefighters has focused on the benefits of greater specialisation, addressing the specific protective requirements of different exposure hazards.

This focus on greater specialisation to address the specific protective requirements of different exposure hazards is true in the municipal firefighting sector, where specialist garments are now regularly used for structural and wildland firefighting and urban search and rescue (USAR) operations. It is equally true in industrial firefighting, where personal protective equipment is required to ensure wearer safety across a wide range of different hazards.

For example, explosions and fires at oil, gas and petrochemical complexes present firefighters with particular, and sometimes unique, dangers. The nature of the fire and its particular characteristics, as well as the firefighting environment, will largely determine the impact on the firefighter in both the short and longer term when bringing hot, hydrocarbon fuelled fires under control.

Some experienced firefighters would argue that training and personal Protection equipment (PPE) are the two most important factors to be considered when assessing the risks to human health and safety associated with such fires. While the financial implications of fires at oil refineries,

oil storage depots and petrochemical plants in terms of damage and consequential loss can be enormous, as was exemplified by the Buncefield incident in the UK in 2005 that, in total, is calculated to have cost £1 billion, most of these costs can be insured against and physical assets replaced. In contrast, human life and the suffering associated with serious injury, whether inflicted on employees, on-site firefighting personnel, local residents or the fire and rescue services, cannot be measured in monetary terms. It must always be considered as the number-one priority when undertaking risk assessments and designing mitigation strategies.

The Petroplus experience

Petroplus is Europe's leading independent refiner and wholesaler of petroleum products with its primary operation in the UK based on the Thames Estuary at Coryton, Essex. Its location is typical of oil refineries in having both water and land boundaries that require a three-dimensional firefighting capability. This includes a waterside resource, land-based fixed monitors and a highly flexible and



Ergotech Action™

mobile firefighting force that can be mobilised and deployed to any on-site location as required by the incident's changing conditions and its associated risks.

Arnie Arnold, the site's fire chief and emergency response specialist, is an experienced firefighting strategist and firefighter whose skills and experience have contributed to a variety of fire-related scenarios from helping at the Buncefield Oil Depot fire to being a member of the Health & Safety Executive's *Safety and environmental standards for fuel storage sites* Process Safety Leadership Group's report and recommendations through its Emergency Arrangements Working Group.

Arnie explains the special characteristics of hot fires associated with hydrocarbon fuel oils that present firefighters with a number of challenges that would be rare elsewhere. These arise from their proximity to flame and high temperatures, the presence of large volumes of water that can become extremely hot and produce dense blankets of steam, and the sheer duration of such fires and the combined impact of all these on individual firefighters.

Examples of the injuries that can arise, if particular care is not taken in selecting the right coats, trousers, helmets, gloves and boots, include blistered feet, scalding to the body and burns at particular pressure points, such as wrists, all of which require protective clothing to be designed using individual materials and fabric combinations that provide the best mitigation against these potential injury risks.

Arnie describes the thorough process used to select the best possible PPE for his 60 firefighters on Station A. "At Coryton we have protected our firefighters with Bristol Uniforms' garments for a number of years and currently use their latest Ergotech™ design incorporating a Nomex® Hainsworth Titan® outer layer. These garments are lightweight and comfortable and comply with all the necessary safety requirements. We specify red as this allows us to visually identify hydrocarbon contamination, which would not be as visible with a blue fabric, and immediately have the garments cleaned". He added: "We have worked closely with Bristol to find solutions to each of these injury risks that are very real concerns for us and which we treat seriously in our efforts to make our firefighters as safe as possible".

Although oil and gas installations and petrochemical complexes present some of the toughest challenges for industrial firefighters and the suppliers of their protective clothing, there are a

number of other industrial sectors that have their own hazards to contend with. Processing combustible materials requires careful risk assessment. The paper and timber industries have their own particular environments to consider that are quite different from those of the plastics industry owing to the different dangers that fires present.

Tightly stacked timber and paper can build high core temperatures that can continue to re-ignite and take days to extinguish. Burning plastics can release a range of dangerous chemical toxins requiring special care for both firefighters and members of the public who should be cleared well away from such fires.

So, it is clear why much greater emphasis has been placed in recent years on assessing the particular risks associated with different types of industrial fire to ensure that the risk assessments, firefighting strategies and firefighter personal protection are specific to the primary hazards each presents. Providing the maximum safety for firefighters, and any other emergency services required to work in proximity to such fires, must always be the priority consideration.

Structural fire protective clothing

In recent years attention has been turned to addressing the issue of firefighter heat stress occasioned by the weight and composition of firefighter garments, which can be a greater risk to the wearer's health than external hazards resulting from the fire itself.

Pioneering physiological trials with different garment constructions measured, among other effects, firefighter garment impact on core body temperature, and led the way to the introduction of lighter weight designs. On the strength of the findings, Bristol introduced a new generation of structural garments that used new materials and fabrics that reduced the overall weight of fire coats and trousers and reduced the levels of heat stress on firefighters, especially under extended operational conditions.

Bristol's Ergotech™ and Ergotech Action™ designs have become recognised internationally as leading examples of this new generation of structural garments. Close collaboration with the world's foremost fabric manufacturers has made possible designs that provide improved fit, wearer comfort and lower levels of heat stress while, at the same time, offering the highest



USAR Action™



levels of protection. This enables both designs to meet EN 469:2005 Level 2.

A triple layer construction incorporates the flame retardant, waterproof and thermal protection within the two outer layers allowing a very lightweight lining to be used. The specification regularly uses a Hainsworth Titan® or PBI® outer layer with a Gore-Tex Airlock® breathable thermal and moisture barrier. An extensive choice of fittings is available in both coat and trouser, which results in 14 male and female standard size options in a range of colours. Special attention to seams and gussets, combined with shoulder, arm and knee articulation features, make for a highly manoeuvrable and comfortable garment.

Wildland Action™

Urban search and rescue PPE

Again reflecting the move towards protecting firefighters with garments specifically designed for special tasks, the increasingly widespread use of urban search and rescue kit by fire and rescue services focuses on the risks associated with non-structural firefighting situations.

Typically referred to as USAR garments, this type of clothing is designed to protect firefighters, and other emergency services personnel, engaged in confined space rescue operations that can include a range of scenarios from structural collapse to road traffic accidents. In such situations, rescuers are required to work in environments that often follow a structural fire or road accident in which a vehicle fire or fuel or chemical spillage may have been involved. The potential danger of the re-ignition of a fire requires the wearer to be protected against heat and flame, water penetration and physical protection against injury from broken masonry, glass and metal.

To protect against these particular operational hazards, Bristol USAR garments, for example, incorporate two layers – a protective outer layer and a breathable moisture barrier. A choice of Nomex® Delta C, Protex Cotton or Kermel fabric is used for the outer layer in combination with a Gore Crosstech® SR moisture barrier. The rescue coat and trouser combination has been designed to form a one-piece garment, when required, by incorporating a zip attachment facility. The garment meets the general flame protection European Standard EN ISO 11612. USAR garments are commonly supplied in orange or high-viz orange and are also available in red or navy.





Flexibility and ease of movement are key features of this garment. The coat incorporates a pleated back, articulated sleeves, underarm gussets and vents and padded elbows with Arashield external panels. The trouser has articulated knees, curved top seams and an Arashield centre panel with Kevlar internal knee pad. Drag rescue straps on the shoulders aid emergency extrication should this be required.

depends upon a garment that will protect against heat and flame but also minimise the physiological impact of body heat and sweat on the wearer.

Bristol's solution includes a two piece jacket and trouser combination and a one piece coverall. Both are ergonomically designed to ensure the garments are comfortable, durable and easily cleaned. Colours have been chosen to meet local and national requirements throughout the world and

Wildfires and bushfires present firefighters with some of the most dangerous operational conditions. Not only are these types of fire characterised by intense heat, smoke and burning debris, but conditions can often be made worse by winds that can make the movement and direction of the fire difficult to predict.

Wildfire firefighting garments

Wildfires and bushfires present firefighters with some of the most dangerous operational conditions. Not only are these types of fire characterised by intense heat, smoke and burning debris, but conditions can often be made worse by winds that can make the movement and direction of the fire difficult to predict. In many areas of the world, where drought and high temperatures create fire conditions most years, the primary task of firefighters is containment to prevent or minimise loss of life.

For firefighters working in these environments, which frequently involve long shifts in arduous conditions, their personal safety and protection

to protect to the latest European Standard EN 15614. An Aramid Viscose blend has been used for the outer layer to provide optimum protection, especially against radiant heat, and a light weight 260 gm² construction. Both garments are supplied in a combination of yellow and green, with a navy trousers option for the two piece.

Special features include a double layer fabric to the front of the trousers, or below the waist and on the shoulders on the coveralls, for tough protection against undergrowth, sharp thorns and other foliage. Ease of movement is provided by pre-bent elbow seam and articulated knees in the two piece garment whilst the coverall incorporates a pleated action back.

Paul Gibson is International Sales Manager at Bristol Uniforms

For more information go to www.bristoluniforms.com

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Sydney AARF Take Aerial Firefighting



By Graham Collins

The new Airbus A380 is the world's largest airliner, and Sydney Airport in Australia currently handles 60 A380 movements every week, making it one of the busiest A380 airports in the world. It also presented Airservices Australia with a demanding firefighting challenge that it overcame with the addition of a new aerial fire fighting vehicle to its Sydney Airport Aviation Rescue and Firefighting fleet.

Airservices Australia employs 650 highly trained and experienced firefighting and technical staff that provide Aviation Rescue and Fire Fighting (ARFF) services at 21 airports around Australia. On average, Airservices firefighters are called out around 150 times a week across Australia's regional, domestic and international airports and, in the past two years, they have saved more than 20 lives.

Airservices Australia's primary roles are to rescue people and property from an aircraft that has crashed or caught fire during landing or take-off, and to control and extinguish fires and protect people and property on the airport in general. To achieve this it operates and maintains a fleet of more than 75 specialised, high-performance aviation firefighting vehicles, water rescue boats and domestic response vehicles. It also utilises the largest firefighting vehicles in Australia – ultra-large, high visibility Rosenbauer Mk8 fire trucks, each valued at over AUD \$1 million, that can discharge almost 9000 litres of water within two minutes of arrival at an emergency.

Sydney's ARFF challenge

Sydney Airport is eight kilometres south of the city's Central Business District and is Australia's busiest airport that, in 2009, was used by 33 million passengers – an average of 90,000 passengers a day – with a total of 289,741 aircraft movements. Airservices operation at Sydney Airport has a staff of 83 and is on call 24 hours a day. It has both a main fire station and a satellite fire station, from where the service also operates a water rescue service.

The airport is rated as Category 10 by the International Civil Aviation Organization (ICAO); a rating that applies to all airports handling aircraft from 76 metres long up to, but not including, 90 metres, with a fuselage width of eight metres. This new mandatory standard was brought about following the introduction of the new generation of double-deck super-airliner, and is the highest category of certification created exclusively for large aircraft, such as the A380. Its introduction meant that Airservices had to re-evaluate its vehicle fleet at Sydney Airport – which handles 60

s Delivery Of New Vehicle

A380 movements every week – to ensure that it met the tougher safety standards.

The 555-seat, double-deck Airbus A380 has been heralded as the most ambitious civil aircraft program yet. When it entered service 2006 it became the world's largest airliner, easily eclipsing Boeing's 747. It is 72.75 metres long, has a 79.8-metre wingspan and, of particular significance to airport firefighters and rescue teams, towers 24.08 metres above the ground. This compares with aviation's previous "giant", the Boeing 747-400's 19.41-metre height.

In the short term, Airservices Australia loaned a turntable ladder from the New South Wales Fire Brigades to meet Sydney's operational obligations under Category 10, pending arrival of a new aerial vehicle. This has now been replaced by the Airservices' own aerial specialist firefighting vehicle that was designed and manufactured to its specification by Tokyo- and Osaka-based Morita Corporation. Among the reasons cited for selecting Morita was that in excess of 95 percent of the ladder trucks and approximately 55 percent of all fire trucks currently used in Japan are believed to have been built by Morita.

High speed rescue performance

Sydney ARFF's new bright lime-coloured AUD \$820,000 Morita MLK4-30 ladder vehicle joined a fleet of specialist firefighting vehicles based at the airport. It is a high speed ASV, or Aerial Specialist Vehicle, that provides the essential safe elevated capability required when dealing with large wide-body aircraft such as the A380.

The new addition to the fleet also provides support and additional operational capability for ARFF responses to airport infrastructure fires and rescues from height. Its lightweight ladder and light body structure reduces the vehicle's gross vehicle weight, and the superstructure is constructed on a Mitsubishi FP517LR single extra cab/chassis in a 4x2 configuration and provides seating for a crew of two.

The vehicle is fitted with a 500-litre water tank for initial supply to a Morita ME 5 pump, designed to provide easy push-button operation. This is a high- and normal-pressure pump, capable of flows of up to 2850 litres a minute, although this vehicle is not equipped to discharge foam onto flammable liquid fires, unless foam is provided to the vehicle by supporting aviation vehicles. The pump, and the unit's hydraulic oil pressure that is transmitted from an oil pump, are powered by the vehicle's road engine through transmission-mounted power take-off.

To assist with maintaining the airport's Category 10 status, the new Morita ASV at Sydney is supported by a Domestic Response Vehicle (DRV).



Turntable operation

A key feature of the new MLK4-30 is its turntable ladder. This utilises Morita's Gyro Turntable System that incorporates an automatic vibration damper to reduce ladder swaying at heights. It is a smooth ladder stabilising mechanism that is installed on all Morita ML Series firefighting and rescue vehicles, enabling levelling by up to seven degrees.

This turntable ladder enables aerial access to approximately 30 metres above ground – nearly six metres above the top of the fuselage of an Airbus A380, and ensures that firefighters will be able to quickly and safely gain access to the upper decks of an A380 to provide assistance to passengers in an emergency. It has a maximum elevated angle of 75 degrees, and a depression from horizontal of minus 17 degrees.

In just 20 seconds, the four-section high tensile steel extension ladder can take firefighters to a safe working height of 31.3 metres – 30 metres to the top of ladder or bottom of basket. Operations of the ladder – elevation, rotation, and extension – are controlled by levers, each of which has an independent oil pump and hydraulic line, enabling simultaneous operation of all three directional features. The outreach from the turntable's rotation centre to the top of the ladder is 23 metres with one firefighter in the basket. This reduces to 21 metres with two, 18 metres with three and 16 metres with four firefighters. The basket's total load capacity 360 kg.

The vehicle pedestal control is equipped with a number of displays that indicate the ladder position at any time. The computerised monitoring of the vehicle position enables automatic stop, load and speed control to ensure safe operation of the ladder. Under normal operation, the fixed basket attached to the ladder, with operational control from the basket itself. This control can, however, be overridden using the vehicle deck pedestal controls. The basket also allows a water or foam fire monitor or fire hose to be used from an elevated position for firefighting operations. **IFF**



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By Tom Guldner

Marine Firefighting Inc.

LNG - Like It Or Not, It's Here

More and more LNG is being transported around the world's oceans. Tom Guldner reviews the issues faced by first responders and mariners alike.

First, let me state that this article is neither for nor against Liquid Natural Gas (LNG) in the USA. Its purpose is to understand what it is, and how the vessels crews, land-based firefighters and first responders can deal with emergencies.

Opponents of LNG have come up with many false statements about the dangers of LNG, while the LNG industry may lead us to believe there is absolutely no danger in handling it. We, as either marine or land-based firefighters, and the mariners who work with the LNG vessels, must look at this issue with a more unbiased view. Anything is dangerous if used improperly.

Marine Firefighting Inc (MFI) has been involved in providing informational seminars to the tug boat crews that have the task of escorting some of

the large LNG ships into US waters. These tug boats are specially designed for this task, each being equipped with state-of-the-art firefighting equipment. MFI has been familiarising crews with this new firefighting equipment and the properties of the LNG they will be working with.

But, what precisely is LNG?

Liquid Natural Gas is a colourless, odourless liquid that is natural gas in a liquid form. Previously, the world's major supplies of natural gas have not been available to areas remote from the gas wells, as the cost of shipping natural gas in its gaseous state was simply too expensive. Liquefying natural gas reduces its volume 600 times and, because of this reduction in volume, it



became profitable to export natural gas in its liquid form.

The process of liquefying natural gas differs from the liquefying of other gasses. The main difference being that LNG does not require pressurisation to keep it in a liquid state, as is the case with Liquid Petroleum Gases (LPG) such as propane (the marine transport of propane may use

refrigeration to reduce its pressure during transit). LNG is formed by subjecting natural gas to extremely cold temperatures; at -260°F (-161°C) the gas becomes a liquid at atmospheric pressure. Liquids at these temperatures are considered cryogenic.

Cryogenic liquids are liquefied gases that are kept in their liquid state at very low

Currently there are nine LNG facilities in the US that are classified as “on-stream”, with two under construction and a further nine planned. So, if LNG is already set to become a major part in the energy supply chain it is time we address some issues that first responders and mariners should become familiar with.



smoke, as there would be if an equal amount of gasoline vapour was burned.

The weight of LNG is also important. LNG weighs just 3.9 pounds (1.8 Kilograms) a gallon. This is important because the weight of a gallon of water is 8.3 pounds (3.8 Kilograms), which means that the LNG will float on the surface when spilled onto the water. When it evaporates or burns off, there is no environmental mess to clean up.

Regardless of your viewpoint on LNG, it is something that already is a factor in the USA and elsewhere around the world, and will become a much greater factor in the very near future. Currently there are nine LNG facilities in the US that are classified as “on-stream”, with two under construction and a further nine planned, according to Global LNG Limited.

So, if LNG is already set to become a major part in the energy supply chain, I feel it is time that we

temperatures. The word “cryogenic” means “producing, or related to, low temperatures,” and all cryogenic liquids are extremely cold. These gases must be cooled below room temperature before an increase in pressure can liquefy them. Cryogenic liquids have boiling points below minus 150°C (–238°F). Different cryogens become liquids under different conditions of temperature and pressure, but all have two properties in common: they are extremely cold, and small amounts of liquid can expand into very large volumes of gas.

When the natural gas is first removed from the ground it is mostly methane. However, it also contained many impurities, most of which are removed in the liquefaction process. Because of this, LNG is almost pure methane, and so when LNG vapour burns, there is generally no visible

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address some issues that first responders and mariners should become familiar with. Liquefied Natural Gas is not stored under pressure, so some of the problems associated with pressurised gas containers will not apply to LNG.

Addressing the key issues

Because LNG is stored at -260°F , it does present the problem of instantly freezing anything that the liquid touches, including mariners or first responders and their equipment, if they come in direct contact with the liquid. Therefore, all personnel who might come in contact with the liquid in an LNG emergency should be provided with personal protective equipment (PPE) designed to protect against this hazard. The equipment, fire apparatus and emergency vessels are also subject to this cryogenic effect. When dealing with metal – such as the deck of a tug or fire boat – it might be subject to brittle fracture if the cryogenic liquid comes in contact with it.

To obtain an FiFi category (Firefighting 1, 2, or 3), the vessel must have a certain level of firefighting equipment, and most new LNG escort tug boats are equipped with FiFi 1 safety equipment. At all FiFi categories, the vessel must have a deluge system that will protect the vessel and crew from radiant heat. This deluge system is composed of a series of pipes all over the deck and pilot house of the tug boat. Where, at several points, sprinkler heads and deluge nozzles are inserted in the piping.

gas and air mixture is above 15 percent it is too rich to burn.

If you have ever seen a demonstration of an LNG spill or leak you will remember seeing the white cloud that forms. Many mistakenly believe that this cloud is the gas. But, LNG is colourless and odourless, so you cannot see the actual gas. What you are looking at when that white cloud is present is water vapour in the air that is chilled by the extreme cold of the LNG to form a fog or even snowflakes. It is odourless because that is the way natural gas is in its natural state. The odour we all associated with natural gas when it leaks from your cooking stove at home is an odourant called mercaptan and/or thiophane that is added by your local gas utility company. This gives that rotten egg or rotting garbage smell.

Because LNG is merely natural gas in a liquid state, when it returns to a gas it has all the properties of natural gas. If you enter the vapour cloud – and we now know that the white colour is only chilled moisture in the air – you will be subjected to the asphyxiant properties of the gas. So, all first responders should be equipped with and ordered to wear self-contained breathing apparatus (SCBA) until the air is tested and found safe.

Because LNG rapidly reverts back to a gas when heated, most small spills will have both evaporated and risen into the atmosphere or, if ignited, the fire will have consumed the LNG by the time municipal first responders arrive. If it is merely a spill with no ignition, the on-scene action is usually

When water is started, it projects a protective curtain around the surface area of the tug to help protect the vessel and crew from the effects of radiant heat. This allows the vessel to escape the scene of a fire and reach an area of refuge, or it might enable the vessel to enter an area of high heat to affect a rescue.

When water is started, it projects a protective curtain around the surface area of the tug to help protect the vessel and crew from the effects of radiant heat. This allows the vessel to escape the scene of a fire and reach an area of refuge, or it might enable the vessel to enter an area of high heat to affect a rescue. But this water deluge serves another purpose when it comes to LNG. The vessel's deck is continuously wet down and the water on the deck helps to protect the deck from the brittle fracture effects of the LNG. As the LNG hits the water surface it is immediately warmed and disbursed as a gas or washed over the side.

It must be remembered that LNG is just natural gas in a liquid form. Therefore, all the properties that we associate with natural gas will be present as the LNG boils off into a gas. The flammability range of a gas is the mixture of gas and air that would be required for that gas to ignite and burn. Luckily this gas is usually either too rich or too lean to burn and LNG will burn only when it is in a concentration between 5 percent and 15 percent when mixed with air. If its mixture with air is below 5 percent it is too lean to burn, while if the

limited to closing valves to stop the spill and insuring that any vapour cloud is dispersed with water spray, and directed away from any source of ignition.

If the vapour from this minor spill does reach a source of ignition and the gas concentration is within the 5 percent to 15 percent range, the ensuing flame will burn back to its source at a slower rate than that of gasoline or propane vapour. If the spill is ignited initially, its vapours will burn off at the source until all the LNG has been vaporised. The on-scene action at this fire will generally consist of not extinguishing the fire until the source of the leak has been shut and the flow stopped. Quite often the fire will then be allowed to burn until all LNG has been consumed. On-scene first responders will be protecting any exposures that may be in danger, and possibly use fog streams to divert the vapour cloud and quicken the warming of the vapour, so it will rise and dissipate more rapidly.

Extinguishing an LNG fire

If the fire is to be extinguished, you do not use water. Much success has been accomplished with

the use of a combination of firefighting foam and dry chemical agents; the foam of choice here is Hi-Ex high-expansion foam. It has been found that the foam both separates the LNG from sources of ignition and also allows the controlled re-gasification of the LNG through frozen tunnels that form in the foam. The foam must be applied in very large quantities and in a very short time using the latest high-capacity foam generators.

transition is speeded up too much, the expansion of so much liquid into a gas in a small area will cause a RPT. As the California Energy Commission puts it: "A large amount of energy is released during this rapid transition between phases and a physical explosion can occur. While there is no combustion, this physical explosion can be hazardous to any nearby person or buildings."

Much success has been accomplished with the use of a combination of firefighting foam and dry chemical agents; the foam of choice here is Hi-Ex high-expansion foam. It has been found that the foam both separates the LNG from sources of ignition and also allows the controlled re-gasification of the LNG through frozen tunnels that form in the foam.

But, why not use water to extinguish an LNG fire? Water will react violently with the LNG and may cause the fire to flare up and intensify. Another possibility is that the water will cause a rapid phase transition (RPT) of the LNG, turning the LNG into a gas at a normal rate when exposed to the air. When it comes into contact with water this transition from a liquid to a gas is greatly increased; at times, this may even be desirable under controlled circumstances. However, if the

I have done a substantial amount of research on LNG over the past few years and I have come to believe that, if handled properly, LNG can be as safe, if not safer, than many of the petroleum-based energy products currently in use. The LNG industry has a remarkable record when it comes to the marine shipment of Liquefied Natural Gas and if we, as firefighters and as mariners, take the safety precautions seriously we should be able to keep up the industry's record.

IFF

Tom Guldner is President of Marine Firefighting Inc and is a retired Lieutenant of the New York City Fire Department's marine Division.

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Limited-Life & Reusable Gas-Tight Chemical-Protective Suits



By Ian Hutcheson

Saint-Gobain
Performance Plastics

Fire fighters, emergency personnel, defence departments and other professionals who deal with hazardous materials have one thing in common: they all recognise the crucial importance of safety.

Maintaining a robust, compliant arsenal of chemical-protective suits is essential to being readily equipped for an emergency. For serious incidents, the use of fully encapsulated gas-tight suits is standard for monitoring and inspecting the scene, as well as mounting rescue, containment or clean-up operations. In terms of protecting emergency teams, the first choice to be made in regards to gas-tight chemical-protective suits is between limited-life and reusable suits, both of which have similar safety standards and application areas as set out by the EN 943-2 certification.

Yet, when looking for new equipment, cost-effectiveness must also be considered. Value for money has been a common theme across municipal and corporate organisations alike, as already tight budgets are squeezed. Limiting expenditure on new equipment without sacrificing safety is challenging and requires informed decision making.

The most important question to answer in this decision-making process is, how can organisations ensure they receive the utmost in safety and value when selecting chemical-protective gear for their



team? Too often, this decision is made by purchasing departments and is based on list-price alone. However, considering just the acquisition price provides only a partial picture by merely exploring one portion of the entire cost. It is, therefore, insufficient for decision makers in these situations. Total cost of ownership (TCO) analysis is a useful method for comprehensively determining the full cost of chemical-protective suits, as it considers indirect costs such as maintenance, inspection and repair, which can have a dramatic impact on the overall spend level and lead to unanticipated budget over-runs.

So, let us compare the total cost of ownership of the two available classes of gas-tight chemical-protective suits: limited-life and reusable. There are suit options in both classes that are EN-certified per EN943-2 for use in protecting wearers in emergency situations. This certification, as well as the mandatory CE mark, ensures that minimum safety levels are in place for the suits. As the TCO analysis will demonstrate, the two suit types differ significantly in several aspects, all of which are relevant to purchasers looking for quality and value.

Direct cost

Acquisition price

While the list-price should not be the sole consideration in the purchase of chemical-protective gear, it obviously is the starting point of any cost analysis as the most basic and easily determinable element of cost. A comparison between the two different types of chemical-protective suits is, therefore, very straightforward: the average price for a reusable suit is between €2500 and €4000,

while a limited life suit runs between €1000 and €1500.

Indirect factors that Influence cost

When moving beyond acquisition price, there are several additional factors that increase the overall cost of chemical-protective suits.

Inspection and recertification

While financial aspects must be taken into consideration, safety is a factor that no organisation should sacrifice to save a few cents. Consequently, regular inspection is crucial for suits that are intended for more than one use, and these inspections have costs that need to be considered in a TCO analysis.

Reusable suits generally have a shelf life of between five and ten years and are required to be inspected annually by the manufacturers, which costs between €250 and €500 for each suit. Once again, the up-front price alone is not the only cost. It should also be taken into account that the suits need to be sent out for the annual inspection and re-certification; a process that can take two to three months for each suit. During this time, replacement suits must be at the ready to protect personnel, resulting in additional investment. Basically, an organisation must have more suits in its inventory than is actually required to ensure preparedness in the event of an incident. Add to this the cost of shipping and logistics, along with the time needed for administrative purposes, and the inspection and recertification process can be an expensive exercise.

The inspection of reusable suits becomes more complicated if the suits have been used. In such cases, a certificate of decontamination is required before sending the suits out to ensure the safety of those transporting and handling them. Organisations must ensure they have standard operating procedures governing this process. Here, human error is also a possibility with the risk of indirect contamination if suits are not properly cleaned, or if contaminants are particularly difficult to remove.

For limited-life suits, inspections are needed only if the suit has been removed from its package but not exposed to any chemicals; for example, due to a false alarm. Here, inspection procedures are straightforward, as the suit has simply to be visually inspected and a pressure-test performed to ensure that it is still gas-tight. This operation can be performed by emergency personnel themselves or by the main suit providers at cost of approximately €100 to €150. If a limited-life suit is contaminated, it must be disposed of (see Disposability section below).

Most suit usage takes place in practice sessions, making it advisable to dedicate a certain number of suits to training to minimise the cost of replacing or re-inspecting suits that have never been used in real action.

Maintenance and repair

As with any utility object, damage can occur and may make a repair necessary even though both types of suits are extremely robust. The cost for repairs for both limited-life and reusable suits varies, depending entirely on what needs to be fixed, and could range from as little as €50 to patch a small cut to many hundreds of Euros, possibly more. If a suit is significantly damaged, for

example a zip or visor is damaged; it may not be worth repairing as the cost may exceed the acquisition price. This must be analysed on a case-by-case basis and hence creates extra administration costs.

Cleaning

No one wants to put on a suit that has odorous reminders of previous wearers, so cleaning reusable suits is necessary for personal hygiene. Cleaning facilities must be set up, including cleaning areas, access to liquid and detergents, and drying rooms to accommodate a large number of suits. As cleaning is a much less regular occurrence with limited-life suits, the same work and infrastructure requirements are not needed.

Storage

Chemical-protective suits present unique storage challenges. Fortunately, the infrequency of chemical incidents leads to most of these suits being disposed of at the end of their shelf life without ever actually being used at a hazmat incident. Nonetheless, they need to be conveniently and safely stored, yet readily accessible as one never knows the timing of incidents.

Specific and rather tedious storage requirements must be followed for reusable suits. Due to their thick, often rubber-like material composition, they typically need to be laid flat or hung up since repeated folding may cause stress-cracking or seam tape delamination. This means that a large amount of space is required to store the suits, which can be costly and inconvenient. In contrast, limited-life suits are typically lighter, more flexible and take up significantly less room, so they can be stored folded in their original package and removed anytime in a ready-to-use condition.

Disposability

The disposal process for limited-life and reusable suits is much the same. Both will need to be decontaminated before disposal in accordance with organisational procedures. However, once limited-life suits have been contaminated, they must be disposed of, whereas reusable suits have the option to be inspected and reused. There is always the possibility that reusable suits may need to be destroyed after a chemical incident if they are deemed too risky or costly to inspect or repair. Additionally, damage is not immediately obvious in all cases and there is always the risk that the suit has not been 100 percent effectively decontaminated, especially if a mix of hazardous chemicals is present at an incident.

Other factors

While total cost is a very important consideration when deciding on a chemical-protective suit option, there are other factors that cannot be given a monetary value, but should be still taken into account. These “money cannot buy” features include user comfort and safety.

Comfort

Working in gas-tight chemical-protective suits is strenuous, as they are heavier and less flexible than non-encapsulated protective clothing. Features that improve comfort and manoeuvrability can significantly enhance the user's ability to work efficiently, therefore should be considered as part

of an overall assessment of suit options.

In general, the lighter the suit, the less arduous it is for the user to wear. Some limited-life suits, such as the ONESuit® Pro by Saint-Gobain Performance Plastics, weigh less than their reusable counterparts. The ONESuit has a total weight of less than five kilograms, while a reusable suit can weigh up to eight kilograms.

Limited-life suits tend to offer more flexibility than thicker rubber-like reusable suits. For example, the fabric of the ONESuit is engineered for high strength and increased mobility using Saint-Gobain's Coretech™ Barrier Membrane technology.

Safety

As mentioned previously, organisations can find certified options for both reusable and limited-life suits. It is important to note that these suits are also rated against various performance criteria. So, when making a decision, the purchasing organisation should also consider test results of factors such as flex-cracking, as well as flame and puncture resistance.

Summary

Safety and value are equally important considerations when selecting a chemical-protective suit. It is apparent that there are many important factors beyond initial list-price that need to be considered in order to determine the true cost of limited-life and reusable suits. As argued in this article, a TCO analysis can be a useful tool to help decision makers weigh the options by exposing hidden and ongoing expenses, revealing an accurate picture of overall cost.

IFF



Ian Hutcheson is Marketing and Development Manager at Saint-Gobain Performance Plastics.

For more information go to www.onesuittec.com

High Hazard Prote Question: What If?



By Graham Collins

There is more to high hazard fire protection than the installation of detection and alarm systems and the deployment of sophisticated firefighting equipment, vitally important though they are.

Major high hazard fires are, thankfully, comparatively few and far between. Unfortunately, when they do occur the consequences can be economically and environmentally devastating, as well as seriously life-threatening on a substantial scale.

This comparative rarity seems sometimes to lull those responsible for these high risk environments into a false sense of security. They develop a blinkered mindset that sees the problem as being: too big and beyond their ability to cope; fingers crossed, it will never happen; or it is the local fire and rescue service's problem. Sadly, any combination of these is a recipe for disaster. And these disasters do happen.

The Buncefield fire in 2005 at an oil storage terminal in the UK cost in the order of £1 billion; the oil spill fire in Molo, Kenya in 2009 killed at least 113 people. Australia's Black Saturday bushfires in Victoria in 2009 resulted in the death of 173 people and achieved the unenviable epitaph of being Australia's highest ever loss of life from a bushfire. Recently, of course, there was the explosion and fire on the BP oil drilling platform in

the Gulf of Mexico that took 11 lives, did untold damage to the coastal environment and cost a figure that is way off the Richter scale. Now, reports say that the Indonesia government will seek AUD \$2.5 billion in compensation from an Australian-based exploration company that it claims was responsible for an oil spill in the Timor Sea last year.

Even the current global interest in crisis management, disaster recovery and business continuity, which has undoubtedly been fuelled by the recent spate of catastrophic natural disasters, all too often focuses attention on dealing with the aftermath of an event, rather than taking steps to prevent the incident occurring, or escalating, in the first place. While few would deny that it is wise to have contingency plans and replacement resources in place should a disaster strike, there is much to be said for the old proverb that prevention is better than a cure. Prevention is certainly less costly when compared with a fire that destroys a business, kills or injures workers or neighbours, results in major toxic spillages, devastates the environment or

ction – Ask The



results in massive and crippling legal or financial claims.

The challenges can, understandably, so easily appear to be overwhelming and rarely, if ever, does the insurance payout meet the entire cost of recovery, plus it will take months, probably years, for a facility to recover to its pre-event position.

So, is what is needed a complete change of mindset?

Dynamic thinking

Businesses need to get away from exclusively considering what to do in the aftermath of a fire, and start paying much more attention on avoiding being faced with the prospect. More time, money and energy needs to be devoted to implementing sustainable measures that will reduce or eliminate the risk of fire. Certainly, this means giving more thought to both passive and active fire protection, seeing fire engineering as a dynamic and indispensable business continuity process, and devising and implementing fully integrated emergency and disaster management strategies and plans.

The global move towards the greater use of fire engineering techniques and a shift away from

prescriptive fire safety measures has undeniably led to a more scientific engineering approach to fire and explosion protection.

However, there is a need to see fire engineering and the development of fire strategies as an active, on-going process. This is essential to ensure that the solutions remain in line with the processes, staffing and the changing risk environment. It is also important because it is only by constantly reviewing the fire engineering thinking that the passive and active fire precautions can remain appropriate to the fire threat from external factors that today, sadly, include terrorist attack.

Consider for a moment the attack on the World Trade Centre in New York. Its designers implemented what, at the time when construction started in 1966, were probably entirely appropriate fire safety measures; they even allowed for the possibility of a light aircraft colliding with one of the buildings. It is difficult to see how the fire safety measures could have been sufficiently developed and updated to protect against the impact of a fully-fuel-laden airliner, but it does illustrate the principle.

Applying this to high hazard environments,

both passive and active fire safety measures may well need to be completely reviewed if these external threats come in the form of, for instance, new neighbouring processes that, in an emergency, have the potential to spill over. This might include the risk of explosion, with the potential to destroy structural fire protection, protective compartmentation, fire detection and alarm control panels, or fixed suppression for storage tanks. In some instances, it will not so much be a matter of protecting the building itself, as rethinking containment and evacuation strategies.

Today's reality

It is essential to first have a realistic understanding of the facility and its surrounding risks.

Risk assessments, particularly for high-hazard sites, should not be blinkered and restricted to just on-site hazards and challenges. They must take full account of what is going on beyond the perimeter fence to consider the fire, explosion and spillage risks inherent in the surrounding area. Your site may not have a gas main, but your neighbour's might; your raw materials in that particular part of the facility may not be highly combustible, but what about the bottled gas storage depot down the road; your site may be unoccupied at night, but that is precisely when your neighbour might be taking delivery of highly flammable fuel oil.

both you and your neighbour. Be very aware of the risk of overstretching resources and falling into the trap of assuming that you will be the only company needing them at any particular time.

It is also vitally important to ensure that it will be possible to implement a coordinated response. There are no shortcuts. This means having an effective emergency control centre where the incident can be managed and all of the emergency services and activities integrated.

Every firefighter will tell you that what you do in the first few minutes of a fire will determine the outcome of the incident. For this to be an effective and planned response rather than a knee-jerk reaction, it is essential that there is a secure, properly thought out and professionally manned emergency control centre if resources are to be marshalled and managed quickly and effectively. This may demand having both an on-site and off-site emergency control centre, as on-site facilities can so easily be destroyed in an explosion or large-scale fire. There is also the possibility that, in a major emergency, access to the on-site emergency control centre may be denied.

It is equally important to ensure that the correct resources are ready at a moment's notice. It comes down to asking the question: what if? What if the facility's water supply is knocked out by an initial

The global move towards the greater use of fire engineering techniques and a shift away from prescriptive fire safety measures has undeniably led to a more scientific engineering approach to fire and explosion protection.

High hazard fire risk assessments may take some assessors into new and uncharted territory. With the ever present threat of non-financially-inspired attack by protest groups or even terrorists, hell-bent on destruction rather than theft, access security should be also taken more fully into account and become part of the fire strategy. Should, for example, your site's perimeter security defences be strengthened as part of the plan to lessen the likelihood of arson attack?

The assessor should also take proper account of the resources of the local fire and emergency response services. It is foolhardy to adopt the attitude that tackling the type and size of fire challenge that a high hazard site presents is down to the local municipal fire and rescue service. Work closely with them; involve them in your plans; determine what specialist equipment they have; and ascertain if it is available at a moment's notice? If it is not, then amend your fire strategy and resources in line with what external help can be provided.

Cooperation and control counts

Close cooperation with neighbouring facilities is absolutely essential. Emergency preparedness plans need to be integrated with neighbours' plans to see what scope exists for sharing equipment or facilities. But be cautious when placing reliance of equipment and services that you do not directly control, as you need to be sure that these resources can be relied upon around the clock by

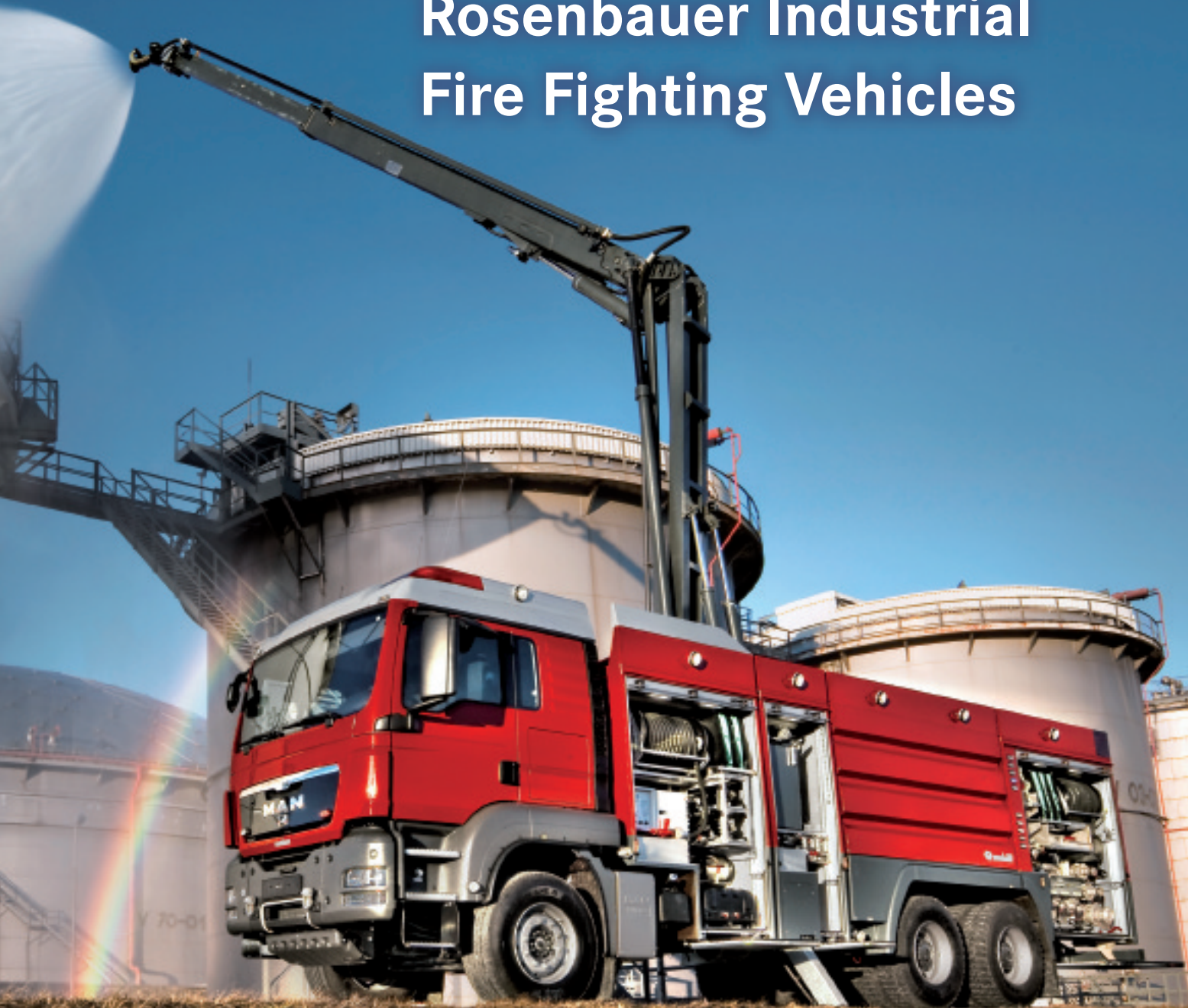
explosion? What if the site's firefighting or fire suppression equipment is destroyed by an initial explosion? Attempting to resolve these issues when a fire has already broken out is not smart thinking, so struggling to come up with workable answers to these questions is certainly not something to embark upon when an emergency occurs. Back-up resources have to be in place, and they have to be constantly under review and be regularly tested.

Put it to the test

Training and testing is absolutely essential; there are no "ifs" or "buts" about it. So too is on-site practice, together with full-scale exercising and testing of every part of the emergency arrangements. It is the one and only way of being sure that the strategy works, and has not merely been a paper exercise.

Regularly test both the likely scenarios and the "what if" challenges; test as many sets of different circumstances as possible. But do remember that this is most certainly not a clip-board exercise. While the majority of emergency tests are conducted mid-day, mid-week, often with plenty of warning, most fires seem to occur in the middle of the night or at the weekend. So that is when the tests should be conducted; without any prior warning. And accept no excuses for people's absence on "pressing business" elsewhere. You have just one chance to fight a high hazard fire, so be sure you get it right first time.

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Simulation Training Pa



By Spencer Michelsen

City of Leduc Fire Services

The ability to pause a structure fire to take immediate corrective actions by one or all of the firefighters is a major benefit of simulation training. If mistakes are corrected then, and strategies and tactics practiced before the fire, there will be far fewer chances that something will go wrong during an actual event

It is 2:23 pm as the tones go off, alerting the fire department of a confirmed structure fire. Staffed with a rookie officer, the first due engine arrives on scene to provide this size-up: "Dispatch Engine One arrived on scene of a house fire!"

Would not it be great to stop the action in order to explain to the new junior officer what you expect from a size-up? It should include a description of what the officer is seeing, who is in command, and what the initial game plan will be. A good size-up is vital because it provides all incoming units with an idea of what to expect on their arrival. If the initial size-up does not provide this important information, the scene and the command is already behind the 8-ball. Obviously, in a real emergency scene, the action cannot be frozen to allow that officer to do a better size-up. If you are lucky, you might remember to speak to him after the call to confirm the related expectations.

In steps simulation training

The ability to pause a structure fire to take immediate corrective actions by one or all of the firefighters is the major benefit of simulation training. If mistakes are corrected then, and strategies and tactics practiced before the fire, there will be far fewer chances that something will go wrong during the actual event.

The key to proper training is designing an effective program. This is especially true with simulation training. One approach is to focus upon one aspect of firefighting, train on it, and build upon it during the next session. For example, correct radio communications could be isolated as one of your department's challenges. It was for me.

In order to assist with better compliance, we provided a lecture on what exactly is expected when communicating via the radio on the fire ground. Then we put it into practice using simulations. During these simulations we concentrated

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solely on communications, making immediate corrections when incorrect terminology or improper radio etiquette was present. After three hours of direct as well as indirect participation in various simulations, we experienced virtually 100 percent compliance.

As with any training model, future simulations would build upon previous topics. For example, a natural sequence would be to move from training on basic radio communications to training on your department's mayday policy. This, then, would

After taking some time in the classroom to review vertical ventilation, the officers and firefighters would then complete multiple simulations that would require various types and locations of vertical ventilation. Now when it comes time to head out to the training centre, firefighters can jump right in to the how of vertical ventilation. They can get up on the prop and begin concentrating solely on the tools and how to make the proper cuts. Compare this to more traditional methods.

Simulations provide unique opportunities for firefighters. When was the last time you allowed your rookie to run command on a multiple alarm fire? Or had your engine company officer run a ladder or rescue company? When firefighters have the opportunity to step into other roles, it allows them to understand those responsibilities and to view fire scenes in a different light.

lead to simulation training for your RIT crews, to reviewing air management, to search patterns and techniques . . . the list goes on. As the simulations continue to grow and become more complex, the previous lessons learned will be continually reinforced.

Since this simulation training environment is so easily controlled, it provides opportunities to answer and solidify the what, where, when and why of strategies and tactics. Once the answers to these questions are understood, then the how can be looked at. Take vertical ventilation, for example.

When we review skills with our firefighters, how many of us gather our crews next to the prop and go over the what, where, when and why of the skill and then move right into the how? I know I've done it and probably still do it too much. I have to ask, is it better for the officer and the firefighter to understand the reason they are making this type of cut in this current location on this type of a building, or the how to make the cut?

Live fire training is exciting and memorable. Unfortunately, unless your department has access to a burn facility, you probably need to rely on



acquired structures. Because of the environmental impact and the strong push towards increased safety, training with acquired structures is becoming increasingly more difficult. Occupational Health and Safety is pushing more and more to prevent workers from exposing themselves to unnecessary dangers. Departments may start asking themselves this question: "Is live fire training worth the risk to the gear, to the environment and ultimately to the firefighters?"

I come from a smaller composite department that has had a fairly significant turnover in the last few years. This has resulted in a younger department and some young officers with a lack of experience.

About a year ago, we had the opportunity to train in an acquired structure. It was a hundred year old farm house with sawdust insulation. We adhered to NFPA 1401 the best we could. We decided to use a burn barrel with a minimal amount of wood and some straw to create smoke. Our idea was to run multiple scenarios with the burn barrels before we actually made some real fire. However, what we found was that at the end of each scenario, our "quick" debriefs were not so quick. Even though the scenarios were not so difficult, there were multiple critical mistakes made. Instead of doing back-to-back-to-back scenarios, we had to correct these critical errors.

Even with the small fires that we had in the barrels, there was enough heat generated to ignite the insulation and we lost the house after only two scenarios.

I do not share this story to air my department's dirty laundry, but I know that if we had used simulation training to prepare for this live burn, we would have been able to complete many more scenarios before losing the house because those critical errors would have been addressed during previous simulations.

One essential aspect of simulation training is getting firefighter buy-in. Most firefighters are hands-on people who would rather be feeling the heat, pulling ceiling, and





spraying water, than sitting in a computer lab facing fake fire scenes. Buy-in for simulation training can be achieved in two ways.

First, make the training as real as possible. Incorporate your dispatch into the evolutions with actual tones and dispatch information, using real addresses or businesses in your first due area, keeping firefighters separated to force them to use their radios instead of just talking one to another, and making sure to follow your department's operating guidelines in every evolution.

Secondly, create simulations that will have a personal impact. In October 2008, Sacramento Fire responded to a fire in which three firefighters became trapped by fire on the second floor of a residential structure. All escaped, but there were valuable lessons to be learned from this incident. I reviewed this case study with my crew, pinpointing how we could avoid a similar situation. During our next simulation training, I created a scenario that mirrored this case study to determine to what extent my firefighters retained what we had studied. When firefighters connect a simulation with real life, they are more likely to buy-in to the simulation.

Besides training, simulations provide rather unique opportunities for firefighters. When was the last time you allowed your rookie to run command on a multiple alarm fire? Or had your engine company officer run a ladder or rescue company? When firefighters have the opportunity to step into other roles, it allows them to understand those responsibilities and to view fire scenes in a different light. As they have now been in the chief's position during simulation training, when he directs everyone to exit the building, the interior firefighters understand that "Yes, the chief can actually see things that I cannot."

When everyone is allowed to participate in all of the roles during simulations, a future leader often shines through. He may be a junior member who one day will emerge as an outstanding officer, and even now deserves to be mentored by strong

leaders. You may also discover others, although excellent firefighters, who are not interested or equipped to become future leaders.

Taking this idea one step further, what about those firefighters who are truly interested in becoming officers? Most departments provide written tests and interviews, but how are these candidates evaluated on their command presence or their implementation of the strategies and tactics that they assume they know? A well constructed simulation, as part of the selection process, can give each candidate an equal opportunity to demonstrate knowledge and ability.

The fire services are full of tradition. There is a banner in a popular movie that states, "100 years of tradition unimpeded by change." Sadly this is not the best motto for improvement. If you have been in the service for any length of time, you have probably heard the words "because that is the way it has always been done." I know I have. Simulations provide the opportunity, just like a real fire, for firefighters, officers and even chiefs to sit down and discuss the scenario that was just completed. Many times during these debriefs, someone will say, "We could have done something different." What a real fire does not permit is the ability to set the exact same fire, with the exact same response, in the exact same structure in order to try that "something different." Simulations provide for that opportunity. There is a real chance that after discussion and trying "something different" in various simulations, a new strategy or tactic may be implemented in your department.

If used wisely, simulations will positively impact your department as they allow for the honing of strategies and tactics in a controlled environment without endangering firefighters. Once firefighters buy-in to the concept of simulation training, they will love it.

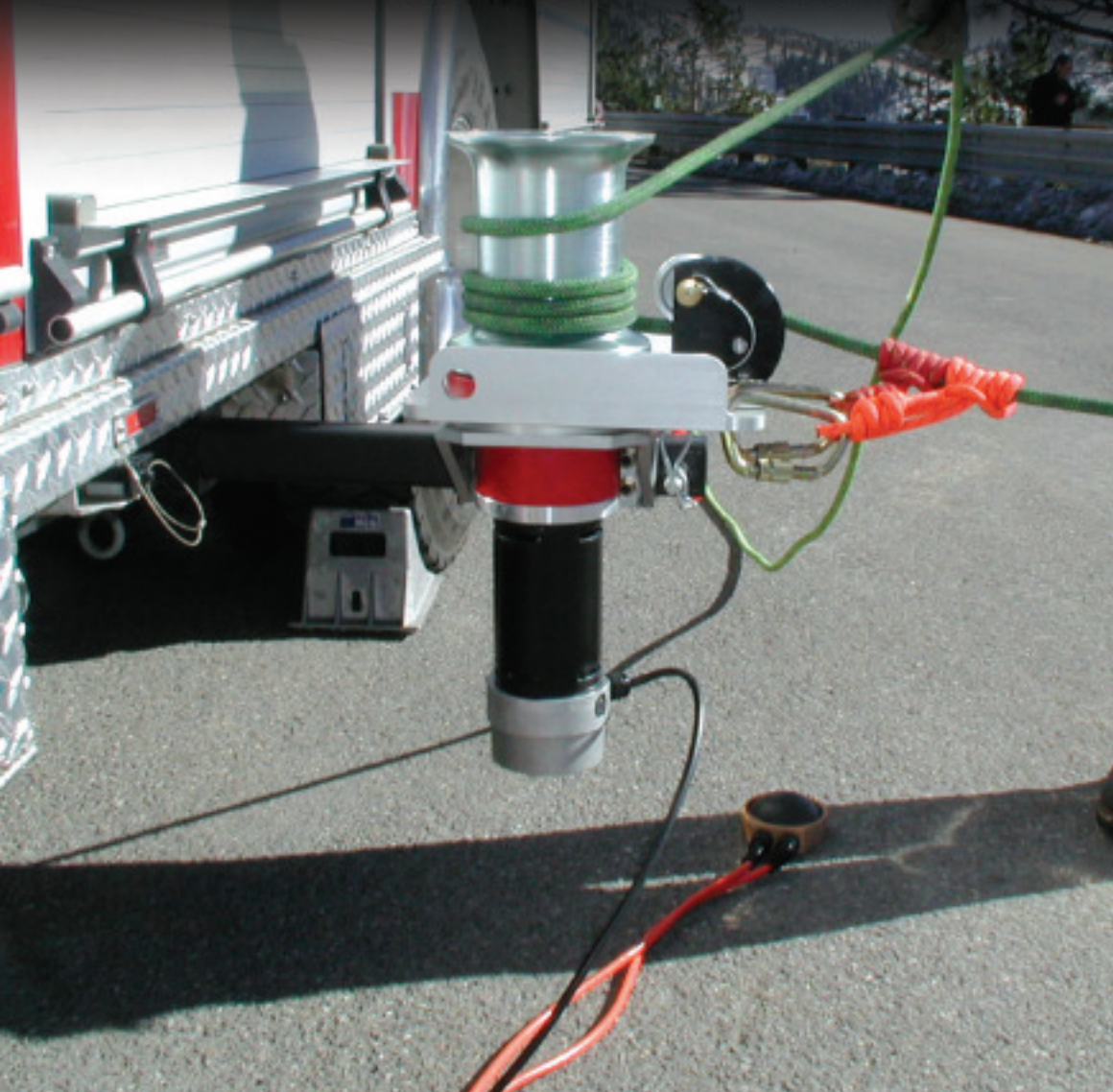
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By **Niilo Alakopsa**

Falck Nutec NL

Offshore Safety – Learning The Lessons From Past Disasters

Is a disaster such as the 2010 Deep Water Horizon in the USA in the gas and oil industry possible in the Netherlands?

In the Netherlands, the controlling body on safety, health and environment is State Supervision of Mines (SSM) at the Dutch Continental Shelf. The SSM is a part of the Ministry of Economic Affairs. The mission of SSM is to ensure that the extraction of minerals is carried out in a responsible and socially acceptable manner. In 2006 an investigation was launched named: 'Gas releases', 'Maintenance Management', 'Fire & Explosion' and 'Rescue at sea'.

On the 23rd of November 2006, State Supervision of Mines (SSM) announced to the Operations Committee of NOGEP (Netherlands Oil, Gas, Exploration and Production Association) that four inspection projects would be carried out during the course of 2007 and that these would be based on health and safety documentation. It was said to be of the utmost importance that the barriers that must be implemented according to the health and safety document were actually in place and operational. The four inspection projects would focus on the prevention of gas releases, the prevention of escalation and the evacuation and rescue of the workforce. Thorough preparations were made in the spring so that these projects could be targeted

as effectively as possible and with a minimum amount of supervision burden.

The projects would be initiated during the summer with a trial inspection under each of the following headings: 'Gas releases', 'Maintenance Management', 'Fire & Explosion' and 'Rescue at Sea'.

For each project, a central question was formulated to be addressed during the inspections. These were:

- Are gas releases sufficiently prevented?
- Are the barriers and safety-critical systems working correctly?
- Can the workforce be safely evacuated from an installation, in the event of a fire or an explosion?
- Is a well-organised rescue and evacuation system in place in the event of a disaster?

The following incidents are examples that illustrate the necessity of these projects:

- In September 2003, a serious accident with two fatalities occurred as a result of a gas release in the UK section of the continental shelf. The incident was caused by inadequate maintenance.



- Based upon information from the NSOAF (North Sea Operators Authorities Forum)/IRF (International Regulators Forum) 1 databases for gas releases, it appears that, in the UK section of the continental shelf, there has been a 40 percent reduction in the number of gas releases during the past four years. The majority of gas releases appeared to occur in the compressor modules.
- Disasters at BP (Alaska Pipeline and Texas City) demonstrated once again that it is not possible to make unlimited cuts in maintenance budgets and that maintenance is an essential part of the management and operation of installations.
- The emergency landing of the NOGEPA JSAR rescue helicopter on the 21st November 2006 highlighted a number of points for improvement with regard to the rescue plans.
- Disasters at installations in India and Egypt, together with a major blow-out at an installation in Norway, demonstrated once more that the Piper Alpha disaster was not a unique occurrence.

Each project would be concluded with the publication of a separate final report. Wherever possible, the results of the projects would be presented jointly, including to NOGEPA.

The consequences of gas releases can be catastrophic as demonstrated by the Piper Alpha and Mumbai disasters. This is why the topic of gas releases requires constant vigilance. With this in mind SSM launched its project "gas releases" back in 2005 and the project has been repeated on an annual basis ever since. The focus of the project includes the reporting and recording of gas releases, the implementation of the IRF guidelines, corrosion and erosion, the prompt detection of gas and the findings of the Nogepa working group "Gas Leakages".

Other areas of attention have been identified as a result of actual incidents and accidents that took place within the sector. The project also examined the reporting practices of gas releases by individual mining companies. Ever since SSM first launched its project, the reporting of gas releases to SSM has improved. The Nogepa working group "gas leakages" was set up in 2006 in order to ascertain the causes of gas releases and to learn from them.

Through the working group, the mining companies have set up a joint gas releases database. According to the database, major gas releases have occurred in the mining industry at a rate of approximately three a year for a number of years. During the past five years, the number of reported significant gas releases has also risen from 29 to 38.

An important reason for this is more focus on discovering and fixing of gas leakages. An open reporting culture has developed. The industry wants better understanding of the causes of gas releases in order to carry out targeted actions to reduce the number of gas releases.

Results of the "rescue at sea" inspection project

The inspection project "rescue at sea" was carried out between August 2007 and May 2008. The project served as a repeat of a project undertaken in 2003/2004 relating to the same subject. The objective of the project was to verify whether the barriers (in the form of facilities and measures) for the rescue and/or evacuation of employees were actually in place and also whether these barriers were in proper working order.

The scope of this project included the following topics:

- 1 Organisation.
- 2 Training programmes.
- 3 Training exercises.
- 4 Safety and rescue equipment.
- 5 Escape routes.
- 6 First Aid.
- 7 Communication and notification.

8 Rescue scenarios, particularly:

- Man overboard.
- Helicopter ditch.
- Helicopter crash.
- Fire/explosions.
- Collision by a vessel.

Findings have been observed where improvements could still be made. These concern the following points:

- Continued attention is necessary to ensure that the periods for re-inspection or certification are not exceeded.
- Registration, remedial action, monitoring and close out of actions and lessons learned from training exercises could be improved.
- It is recommended to use PLBs (personal locator beacons) during the “man overboard” (MOB) training exercises. This provides crews of man overboard fast rescue craft with the opportunity to practise the use of PLB direction finders.

In the Netherlands the NOGEPa asked training providers to implement the findings in the Emergency Response Training. The operators in the Netherlands are training according to the NOGEPa handbook. The following items were asked by NOGEPa to form part of the courses.

- 1** In the scenario training based on refresher emergency response training gas releases be implemented.
- 2** PLB and crew finder direction finders be installed on FRC and used during MOB training.
- 3** PLB's be introduced during Helicopter Underwater Escape Training (HUET).
- 4** Integrate personal descending systems in the survival course to replace emergency ladders and scramble nets.

Conclusions from SSM after evaluation the “Gas releases”, “Maintenance Management”, “Fire & Explosion” and “Rescue at Sea” reports were that there is a possibility that a major disaster can happen and that operators must take their responsibility. SSM listed eight eye-openers and six focus points.

Eye openers, with Piper Alpha as study case:

- 1** Some say “near misses prove we do control them”. Last year there were three worldwide burn-downs; three North Sea near misses; five Dutch offshore majors; and 18 Dutch offshore significant events.
- 2** Events were not foreseen as credible scenarios. Ruptured pipes leaked fuel to lower decks on gas pipelines.
- 3** Piper had enough fuel on board to explain the escalation; 50 tonnes of oil in equipment and 125 tonnes of diesel storage under the roof. Both oil and diesel fires generate smoke.
- 4** Early explosions caused severe damage to the whole deluge system, including the main header. It would never have worked. The fire pump had an electrical override in place; two men tried to pull it. They were never seen again.
- 5** Smoke ingress doors at every attempt to



escape. People were pushed back by fierce heat and intense smoke. Remarkably, the fire dampers were closed and the accommodation withstood the heat.

- 6** Most fatalities were caused by carbon monoxide poisoning. Intoxication, lack of hope and disorientation (the lighting failed) ensured the emergency organisation fail.
- 7** The OIM was not trained for this scenario nor is he today. The accommodation was surrounded by smoke and fire.
- 8** Employees had to make choices for which they were not trained. 50 percent left the accommodation; 25 percent of them survived. They were trained to get off by helicopter or lifeboat, and three were trained each year for survival at sea. Focus points for the operator included:
 - 1** Minimise fuel, such as gas, methanol, condensate but also heavy fuels (oil, diesel and glycol).
 - 2** Position accommodation and control room at as low a position as possible. Protect escape routes and life boats against heat and smoke. Improve the safety of temporary living quarters.
 - 3** Close in all fuel, process equipment, risers and pipelines. Guarantee operation of shutdown valves, especially in an emergency and after explosions.
 - 4** Close off pipeline floor and other transits. They were a major cause for Piper's external high pressure gas pipeline fire. Have sufficient drain capacity and do not seal off drains.
 - 5** Escape routes should be protected against fire and smoke, especially from accommodation areas to the sea. Smoke integrity of accommodation should be proven, including the integrity of doors. Personal protection equipment should be available at strategic places, including escape routes, muster place and not just in cabins.
 - 6** Provide means and training for escape other than helicopter or life boat. Uniform way of descending to sea, personal protection at muster places, Personal locator beacon required to get rescued in time.

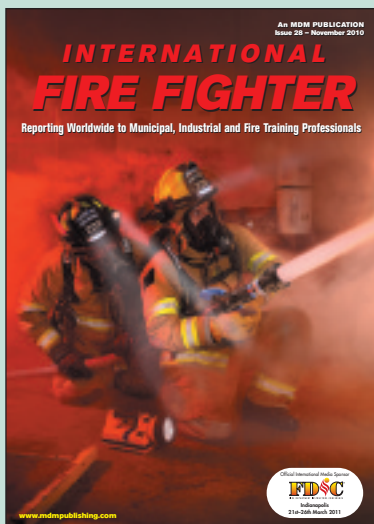
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E-mail: ian.callaghan@pbipproducts.com

Im Gewerbepark D23 // D-93059 Regensburg, Germany
T +49 (0) 941 465 275 9-9 // F +49 (0) 941 465 275 9-8
E-mail: helmut.zepf@pbipproducts.com

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